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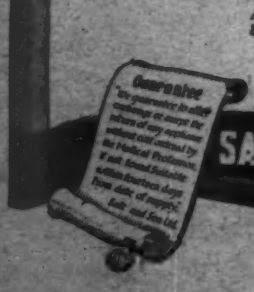

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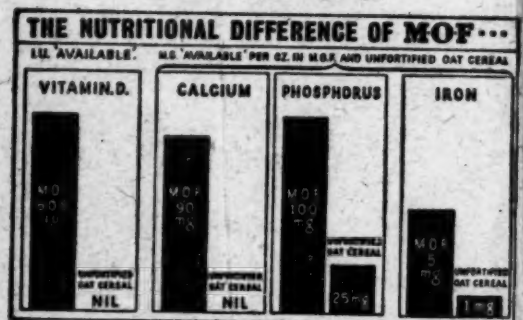

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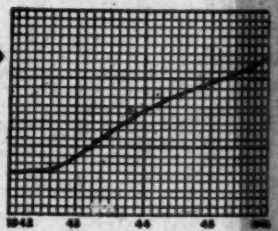

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 9 1947

LIVER FUNCTION TESTS IN THE DIAGNOSIS OF JAUNDICE

A REVIEW OF 200 CASES

BY

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It is now generally agreed that no one liver function test will give a satisfactory picture of the activities of an organ which has so many metabolic tasks to perform, and the present tendency, particularly in the United States, is to use a battery of tests in every case of suspected liver dysfunction. Thus Watson (1944) advocates eleven tests for jaundiced and seven for non-jaundiced patients; other workers have used similar combinations (Mateer *et al.*, 1942; Neefe and Reinhold, 1946).

In this country few hospital laboratories have had the technical assistance required to follow these suggestions on any worth-while scale, and this has led to a rather conservative devotion to older tests such as the van den Bergh reaction, which has only a limited value in the differential diagnosis of jaundice. Thus while recent quantitative modifications of this test are certainly useful in distinguishing between retention and regurgitation jaundice (Watson, 1946; Gray, 1947), the older claims to distinguish toxic from obstructive jaundice by this means have been abandoned by experienced clinicians and pathologists. A recent report by Sherlock (1946) indicates that similar objections apply to the serum protein and cholesterol estimations and to the intravenous galactose tolerance and hippuric acid tests. Unfortunately this latter distinction—obstruction versus hepatitis—is a much more frequent diagnostic problem in jaundiced patients.

The present communication is concerned with two types of test—the serum alkaline phosphatase estimation and certain flocculation tests—which have been the subject of previous reports (Maclagan, 1944a, 1944b, 1944c, 1945). Although somewhat empirical in nature these tests have the advantage of technical simplicity and of being applicable to a single blood specimen. The combination has proved of particular value in distinguishing obstructive from non-obstructive jaundice, no doubt because the phosphatase shows a maximum deviation from normal in obstructive jaundice while the flocculation tests show maximum abnormality in hepatitis. It is hoped that they will be found useful by those who have lost faith in the older tests and have not been able to adopt the "battery" method of approach. While no combination of tests will give a definite diagnostic answer in every case of jaundice, the methods described here appear to be reliable in a high proportion of cases with a reasonably small expenditure of labour and materials.

Material

This consists of 200 consecutive jaundiced patients (serum bilirubin concentration over 2 mg. per 100 ml.) seen personally during the last four years in whom the cause of the jaundice was satisfactorily established by methods independent of the tests themselves, to the satisfaction of the clinician in charge of the case. Table I gives a detailed

TABLE I.—*200 Cases of Jaundice*

Diagnosis	Obstructive	Acute Hepatitis	Chronic Hepatitis	Haemolytic
No. of cases	56	118	15	11
Basis for diagnosis:				
Clinical	9	108	8	11
Operative	25	3	3	—
Necropsy	22	7	4	—
Age in years:				
Average	56·7	33·2	39·7	45
Range	24–76	17–71	10–58	22–64
Duration of jaundice (weeks):				
Average	6·5	1·4	53	29·7
Range	1–72	0·2–8	5–250	1–100
Serum bilirubin mg. per 100 ml.:				
Average	9·7	6·8	3·5	2·9
Range	2–24	2–25	2–8·3	2–8·1

analysis of the cases, on which the following comments may be made. The obstructive cases show, as would be expected, a higher average age and serum bilirubin than the other groups, and their average duration of jaundice (6.5 weeks) was intermediate between acute hepatitis on the one hand (1.4 weeks) and chronic hepatitis on the other (53 weeks). The obstruction was due to neoplasm in 37 cases, to gallstones in 17, and to lymphadenoma in 2. Diagnosis was by operation or necropsy in 47 of these 56 cases. The 118 cases of acute hepatitis were made up as follows: infective hepatitis (95), post-arsphenamine jaundice (13), jaundice with peritonitis (3), homologous serum jaundice (2), trinitrotoluene jaundice (2), glandular fever (1), leptospiral jaundice (1), eclampsia (1). There were six fatal cases of acute hepatic necrosis in the infective hepatitis group, and the patient with eclampsia also died. Chronic hepatitis cases were mainly of multilobular cirrhosis, but included five cases of chronic jaundice following acute hepatitis and one of Banti's syndrome. The haemolytic jaundice was classified as acholuric in four cases, post-transfusion in three, and of unknown aetiology in four.

Methods

1. *Serum Alkaline Phosphatase* (King and Armstrong, 1934).—Normal limits, 3–13 units. This method was latterly modified to use 0.2 ml. portions of serum, and the results were read on the King–Gallenkamp photo-electric colorimeter, but the original barbitone buffer was retained throughout.

2. *Serum Colloidal Gold Reaction.*—The buffer methods of Maclagan (1944a; 1946b). These two methods have been

shown to give the same results, but the later one employs an easier method of preparing the gold sol.

3. *Thymol Turbidity Test.*—The original method (Maclagan, 1944b) was used throughout except for a slight change in the turbidity standards noted below. This technique has now been used satisfactorily by a number of workers (Watson *et al.*, 1945; Cohn and Lidman, 1946; Havens and Marck, 1946; Maizels, 1946; Klatskin and Rappaport, 1947; Mawson, 1947), but as others have reported certain difficulties or modifications the following additional technical notes may be of interest.

(*a*) The *p*H of the thymol buffer was originally given as 7.8, but Volwiler (1946) found it to be 7.67 and adjusted it to 7.8 by the addition of more sodium barbitone, which would also have the undesirable effect of raising the ionic strength. Mateer *et al.* (1947), on the other hand, agreed with *p*H 7.8, but found their reagent too insensitive and adjusted the *p*H to 7.55. Some of these differences may well be due to difficulties inherent in the standardization of *p*H measurements, such as temperature effects and choice of check solutions. The value of *p*H 7.8 was obtained with the glass electrode (Marconi) at 20° C. using M/20 potassium hydrogen phthalate as a standard of reference with a value of 4.0, and is in fair agreement with the *p*K value of diethyl barbituric acid, given by Britton (1942) as 7.92. It should, however, be emphasized that the buffer was designed to have a salt–acid ratio of 2:3 rather than a *p*H of exactly 7.8. It is of course quite possible to increase the sensitivity of the reagent by lowering the *p*H, but data previously presented (Maclagan, 1944b) indicate that this would probably have the effect of diminishing the specificity of the reaction. In any case it would seem to be inadvisable to make any alterations in the buffer purely on the basis of the *p*H measurements, which are in general hardly accurate enough for this purpose unless very special precautions are taken. It is probably more important to check the purity of the reagents, as the possibility exists that certain brands of sodium barbitone may contain an excess of alkali and therefore yield an incorrect buffer. Thus 0.416 g. of the sodium barbitone should require exactly 20 ml. of 0.1 N hydrochloric acid for titration to methyl orange, and the barbitone should melt at 190 ± 1° C. (uncorrected). A rough check on the final *p*H with phenol red is a useful safeguard. Finally, an undue proportion of negative results such as those of Mateer *et al.* (1947) would obviously suggest the need for investigation, and as a rough guide the positives in a series of cases of *epidemic* infective hepatitis should amount to at least 90%. In the present work no readjustment of the buffer has been found necessary.

(*b*) Various photometric methods of measuring the turbidity have been published (Shank and Hoagland, 1946; Ley, Lewis, and Davidson, 1946), in which the measurements are standardized against barium sulphate suspensions. I have had difficulty in getting reproducible results with methods of this type, and in the present series visual comparison was adhered to throughout. The standards have, however, recently been made up from diluted normal serum of known protein content treated with three volumes of 3% sulphosalicylic acid. These appear to be as stable as the formazine standards and are simpler to renew and control. A similar recommendation to return to the simpler visual comparison was made by several speakers at the Conference on Liver Injury, New York, 1946.

(*c*) The normal limits, originally given as 0 to 4 units, have been criticized, and Neefe (1946) and Mateer *et al.* (1947) both consider values above 2 units as abnormal. This question seems to depend upon the choice of normal controls, and there is no doubt that completely healthy persons do give lower figures than those I obtained on "non-hepatic" hospital patients. Values between 2 and 4 units are relatively frequent in disease apparently unconnected with the liver, and it was in an effort to avoid these "false positive" results that the limits of 0 to 4 were suggested. However, if the test is being used for screening purposes on apparently healthy persons, the limits of 0 to 2 would no doubt be more appropriate. These considerations would not affect the arguments used in the present paper, in which an identical diagnostic significance has been accorded to negative and weakly positive flocculation tests.

4. *Thymol Flocculation Test.*—This is performed as an adjunct to the thymol turbidity test by allowing the tube to stand overnight and recording flocculation, as recommended by Neefe (1946) and Maclagan (1947). Some difficulty was experienced in grading the amount of flocculation consistently, and eventually the following procedure was adopted. If flocculation was *complete* the amount was related to the turbidity reading with the following convention:

Turbidity units	0–4	5–7	8–10	Over 10
Flocculation (if complete)	1+	2+	3+	4+

Any case showing *incomplete* flocculation was recorded as 1+, and absence of flocculation as 0 or negative.

Results

The results are shown in Figs. 1, 2, and 3. It will be seen that there is a clear general tendency for the obstruction cases to have high phosphatase values and negative flocculation reactions (top left-hand corner), while cases

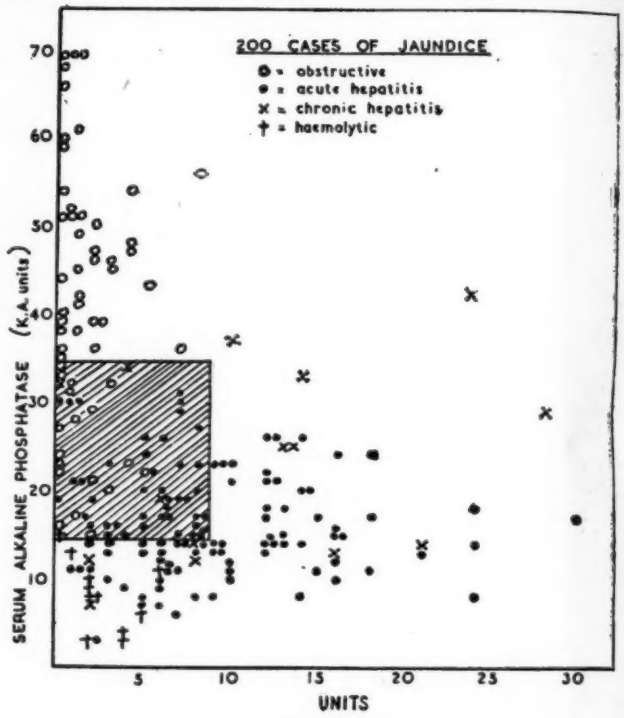

FIG. 1.—Thymol turbidity test

of hepatitis usually have positive flocculation reactions and normal or moderately raised phosphatase figures (bottom right-hand corner). The cases of haemolytic jaundice tend towards the bottom left-hand corners—that is, they have low phosphatase values with normal or weakly positive flocculation reactions. An intermediate zone contains cases of all types.

In interpreting the results it is of the greatest importance to distinguish between those of diagnostic value (unshaded in charts) and those which are equivocal and not of diagnostic value (shaded in charts). In this respect the following conclusions apply to all the 200 cases without exception:

1. All cases with phosphatase levels above 42 units were obstructive (26 cases). All with phosphatase levels below 15 units were non-obstructive (67 cases); it should be noted that all the 11 cases of haemolytic jaundice are included in this group.

2. All cases with strongly positive flocculation reactions were non-obstructive. These include: 92 cases with 2, 3, or 4+ thymol flocculation; 60 cases with 4 or 5+ gold reactions and 55 cases with thymol turbidity over 8 units.

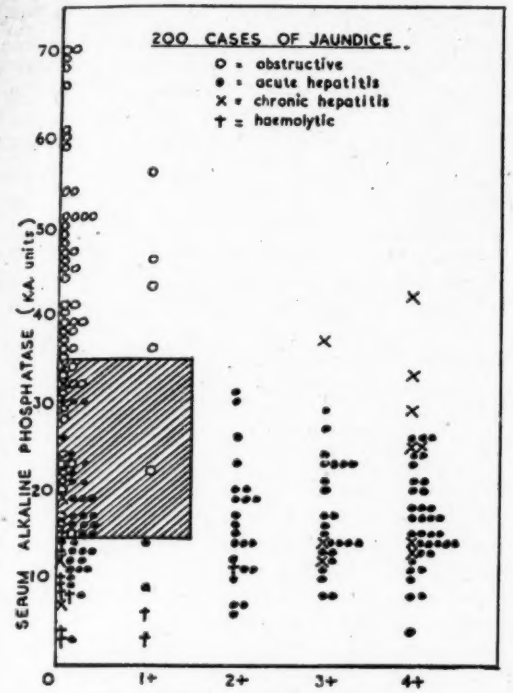

FIG. 2.—Thymol flocculation test.

3. All cases with negative or weakly positive flocculation reactions and, in addition, phosphatase levels above about 35 units were obstructive. These include: 38 cases with thymol flocculation 0 or 1+ and phosphatase above 35 units; 37 cases with thymol turbidity below 9 units and phosphatase above 35 units; and 34 cases with gold less than 4+ and phosphatase over 37 units.

4. All other combinations of results (shaded in charts) can occur in both types of jaundice and should therefore be regarded as equivocal except in so far as a raised phosphatase value is against a purely haemolytic type of jaundice. Nevertheless in cases where they approach the limits of these areas they can obviously be allowed a relative importance in diagnosis. For example, a jaundiced patient with negative flocculation reactions and a phosphatase of 33 units *might* have hepatitis, but is much more likely to have biliary obstruction. Similarly, one with weakly positive flocculation reactions and a phosphatase of 18 units *might* have obstruction but is much more likely to have hepatitis.

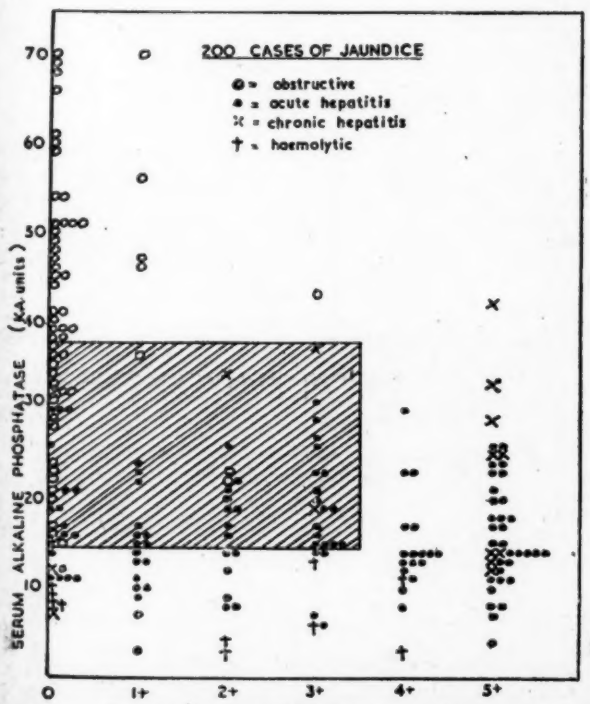

FIG. 3.—Serum colloidal gold reaction.

The alkaline phosphatase results are in close agreement with those of Sherlock (1946), although expressed in a different form. Sherlock gives 30 units as a rough dividing-line between obstructive and non-obstructive cases, and this would also apply to the present series; such a statement, however, fails to express the equivocal nature of results in the region of 15–35 units, which may occur either in hepatitis or in biliary obstruction, and cannot therefore have decisive diagnostic value. The greater frequency of high phosphatase values in chronic as opposed to acute hepatitis is a finding which is well shown in the charts, and has been referred to elsewhere (Maclagan, 1944c).

The relative merits of the various tests are further illustrated in Table II, which shows the proportions of cases falling in the shaded and unshaded areas in Figs. 1, 2, and 3. It will be seen from this table that a combination of the thymol flocculation and phosphatase tests gives the best results, with definite diagnostic information in 79% of cases. The other two flocculation tests in conjunction with phosphatase give a somewhat lower proportion of successful results (68% for thymol turbidity and 65.5% for gold). As opposed to this the best results with any *one* test are 46.5% for the phosphatase and 46% for the thymol flocculation test, so that the advantage of combining the two types of test is evident.

TABLE II.—*Analysis of Results in 200 Cases of Jaundice*

Test	No. Diagnosed	No. Equivocal
Phosphatase	93 (46·5%)	107
Thymol flocculation (T.F.)	92 (46%)	108
Colloidal gold (C.G.)	60 (30%)	140
Thymol turbidity (T.T.)	55 (22·5%)	145
Phosphatase and T.F.	158 (79%)	42
Phosphatase and T.T.	136 (68%)	64
Phosphatase and C.G.	131 (65·5%)	69

All cases in shaded area of Figs. 1, 2 and 3 have been counted as equivocal in this table.

The clinical application of the tests is further illustrated by the following two case reports.

Case Reports

Case 1: Hepatitis Simulating Biliary Obstruction.—A man aged 66 had been jaundiced for two weeks. This had been preceded by anorexia for some weeks following an attack of abdominal pain and vomiting ascribed to food-poisoning, and there had also been a patch of bronchopneumonia during this period with pyrexia to 103° F. (39.4° C.), which had been successfully treated with sulphamezathine. Abdominal pain had then reappeared followed by jaundice with dark urine and pale stools. There had been considerable loss of weight. On examination the liver was enlarged and tender. Cholecystography showed poor concentration of dye. The general picture was thought to be suggestive of malignant disease. The chemical findings were as follows: serum bilirubin, 8.7 mg. per 100 ml.; serum alkaline phosphatase, 17 units; thymol turbidity, 12 units; thymol flocculation, 4+; colloidal gold, 3+. These were strongly in favour of hepatitis, and the patient made a good recovery with medical treatment and has had no recurrence of symptoms.

Case 2: Biliary Obstruction Simulating Cirrhosis.—A woman of 43 had been jaundiced almost continuously, with some waxing and waning, for the past 18 months. The illness started with pyrexia and pain in the right shoulder-blade; the urine had been dark and the stools pale throughout. One year previously laparotomy had been performed at another hospital, but no obstruction to the biliary tract had been found. Cholecystectomy had been done and the common bile duct dilated. No improvement in symptoms had followed this operation, and

a diagnosis of hepatic cirrhosis had been made at that time. Clinical examination showed fairly deep jaundice in a well-preserved woman. The liver was enlarged and hard, and there was also clubbing of the fingers and toes. There was no *x*-ray evidence of calculi. The chemical findings were as follows: serum bilirubin, 10.8 mg. per 100 ml.; serum alkaline phosphatase, 36 units; thymol turbidity, 7 units; thymol flocculation, 1+; serum colloidal gold, 1+; galactose index, 135 (normal, 0–160). These results were strongly suggestive of obstructive jaundice, and a second operation disclosed the presence of a gallstone firmly imbedded in the bile ducts in the region of the head of the pancreas.

Discussion

In a recent article Ivy and Roth (1943) pose the question "Why do a liver function test?" and discuss the value of a variety of tests, not however including the thymol and gold tests. One reason for doing liver function tests is to distinguish obstructive from non-obstructive jaundice. While admitting the limitations stressed by these writers, it would appear from the results given above that for this special purpose the combination of the serum alkaline phosphatase estimation with the thymol or the colloidal gold test may be expected to provide a reliable answer in a high proportion of cases, the actual percentage varying from 65.5 to 79 according to the particular flocculation test used. The actual diagnostic value of these procedures is in practice rather greater than these figures would suggest, for two reasons. First, there is the inclusion of 13 cases of post-arsphenamine jaundice in the acute hepatitis group. These cases have a particular tendency to exhibit negative flocculation reactions (Maclagan, 1944a, 1944b, 1944c), and are in general easily eliminated on clinical grounds; if they are removed from the series the results, particularly with the thymol flocculation test, would be appreciably better. Secondly, although the cases in the shaded areas of Figs. 1, 2, and 3 have been recorded as failures in Table II, in many cases where the results approach the limits of these areas they were of some diagnostic help, as explained above. Nevertheless, it is true that certain combinations of results can occur in any type of jaundice, and there is probably no test or combination of tests which will give a diagnostic answer in every case.

As regards choice of test, thymol flocculation seems to be the best of the three flocculation tests tried. It is, however, known to be rather often negative in post-arsphenamine and homologous serum jaundice (Maclagan, 1947), and it is therefore desirable to retain the thymol turbidity test. The amount of flocculation can then be recorded more accurately as indicated above. The colloidal gold test has no advantage over the other two in the diagnosis of jaundice, but I retained it because of its greater sensitivity in conditions such as rheumatoid arthritis, malaria, and infective endocarditis (Carter and Maclagan, 1946). It is technically convenient to perform these tests together as they require the same small volume of serum (0.05 ml.).

Although all these tests are still partly empirical in character, it has recently been shown that the underlying chemical change in the case of the flocculation tests is probably a relative excess of gamma globulin in the serum (Gray and Barron, 1943; Kabat *et al.*, 1943; Maclagan and Bunn, 1947a, 1947b). Thus electrophoretically separated serum gamma globulin acts as a precipitating agent, and an absolute increase in this fraction has been demonstrated in hepatitis. Similarly normal serum albumin acts as an inhibitor, and this fraction is often reduced in hepatitis; moreover, hepatitis albumin is less effective as an inhibitor than normal albumin. The rise of the serum alkaline phosphatase in liver disease is, however, incompletely understood, having been ascribed to the phosphatase content of the bile (Armstrong *et al.*, 1934) and to secondary interference with bone metabolism (Roberts, 1933). It seems more likely to me that this rise represents a positive secretory response of the liver cell to a variety of chemical or bacterial insults, of which biliary obstruction is the most powerful. It is somewhat remarkable that the liver cell damaged by biliary obstruction should fail so uniformly to produce those protein changes associated with positive flocculation tests, but such appears to be the case.

It is not of course suggested that the diagnostic criteria given above will hold generally without any exceptions, and in interpreting the results the possible presence of complicating diseases such as heart failure and rheumatoid arthritis should be borne in mind, as these conditions may produce positive flocculation reactions even in the absence of jaundice. However, the fact that no exception has occurred in these 200 cases is an encouraging feature. It is also obvious that the tests described will not elucidate every problem in hepatic pathology, and for special purposes other tests will also be required—for example, the serum protein estimation for prognosis (Higgins *et al.*, 1944), and recent modifications of the pigmentary tests for the diagnosis of non-icteric and pre-icteric hepatitis and haemolytic jaundice (Watson *et al.*, 1944; Pollock, 1945; Watson, 1946; Maclagan, 1946a; Neefe and Reinhold, 1946; Gray, 1947). Such tests are, however, of very limited value for distinguishing obstructive from non-obstructive jaundice, which is the special problem considered here, and for which the suggested combination of phosphatase and flocculation tests appears to represent an advance on previous chemical methods of approach.

Summary

The results obtained in 200 cases of jaundice with the serum alkaline phosphatase, thymol turbidity, thymol flocculation, and serum colloidal gold tests are analysed in relation to their diagnostic value.

The combination of phosphatase with one flocculation test will distinguish obstructive from non-obstructive jaundice in from 65 to 79% of cases. The thymol flocculation test is slightly the best of the three flocculation tests tried.

Diagnostic criteria are given for the various tests. Strongly positive flocculation reactions or phosphatase levels below 15 King–Armstrong units suggest non-obstructive jaundice; negative or weakly positive flocculation reactions with phosphatase levels above 35 units suggest biliary obstruction, and phophatase levels above 42 units are also in favour of obstruction.

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RELATIVE ORAL TOXICITY OF SOME THERAPEUTIC IRON PREPARATIONS

BY

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Forbes (1947) and Thomson (1947) have recently described serious consequences in young children, including three deaths, following the unauthorized taking of ferrous sulphate tablets in excessive numbers. These and certain cases previously reported to us raised the general question of the toxicity of iron compounds when large doses were consumed orally, and also of the additional effect, if any, of the small amount of copper and manganese sulphates which were present in the tablets.

Examination of the literature failed to reveal earlier reports of ill effects from orally administered iron compounds, except for occasional references to slight alimentary disturbances. Further, and more surprisingly in view of the widespread use of iron compounds for the treatment of iron deficiency or "nutritional" anaemia, we have been unable to find any account of pharmacological investigations into the action of iron given by mouth, although its effects by injection have received some attention and it is accepted that serious ill effects may follow its absorption into the blood stream.

It therefore seemed desirable to test experimentally on several species of laboratory animal the effects of orally administering very large doses of some of the more commonly used iron preparations. For this purpose we chose ferrous sulphate, with and without the presence of the "trace" metals copper and manganese; ferrous carbonate in the form of Blaud's pills; ferrous gluconate, because of the claims made for it by Reznikoff and Goebel (1937); ferric chloride, so as to include at least one preparation of ionizable ferric iron; and iron and ammonium citrate, widely used in compounded medicines, though nowadays largely replaced by ferrous sulphate for simple oral iron therapy—shown by many workers from Davidson (1933) onwards to be much more effective in haemopoiesis than the non-ionized "scale salts," when compared on an equivalent iron basis. Rabbits and guinea-pigs were used for studying the pathology and histology of any disturbances observed, and mice for the estimation of median lethal doses (LD50) with reasonable accuracy.

As a practical problem in human therapeutics we were really concerned with establishing the "therapeutic index" of ionizable iron—that is, the ratio of its median toxic dose to its median therapeutic dose. Here we encountered two difficulties, the one general and the other particular. First, it is ordinarily impossible to establish such an index for the action of a drug on the human organism, simply because data, unfortunately, are not as a rule available for the median toxic human dose. The pharmacologist therefore normally has recourse to establishing the therapeutic index of a drug on at least one species of laboratory animal, and preferably on more than one. If the value of this index is of roughly the same order for two or more species of laboratory animals it is reasonable to assume that the same value will apply to man; in general, experience bears out this assumption. However, even this line of approach was not available to us, for there is no species of animal—with the possible exception of the rat made anaemic on a milk diet—for which we have information about the median therapeutic dose of iron compounds.

We were consequently forced back on to the unsatisfactory step of relating toxic doses to the body weight of the animal used and arguing on the same basis for man. The objections to this line of reasoning, however, appear much less strong for iron compounds than they might for other drugs, for it will be seen that toxic effects—and, in particular, fatal results—were produced only by doses so immensely out of proportion to the animal's normal intake of iron as to make highly unlikely the ingestion of dangerous amounts by human subjects. The facts established by our experiments nevertheless make it clearly desirable to render access of infants and small children to iron preparations as difficult as possible. Such precautions would normally be taken with many of the common drugs to be found in the ordinary household—for example, quinine salts and acetylsalicylic acid—without in any way detracting from their value and importance in therapeutics.

Toxicity

The results obtained with the three species of animals used are summarized in the accompanying table. The

Table showing the Median Lethal Toxic Doses of Iron Compounds by the Oral Route

Compound	Iron in Preparation, Calculated as Fe	Dose per kg. of Body Weight					
		Rabbits		Guinea-pigs		Mice	
		Actual	Cal. as Fe	Actual	Cal. as Fe	Actual	Cal. as Fe
	%	g.	g.	g.	g.	g.	g.
Ferrous sulphate crystals	20	3·0	0·6	1·5	0·3	4·5	0·9
Ferrous sulphate prep. with copper and manganese	24	3·0	0·72	1·25	0·3	4·1	1·0
Ferrous gluconate ..	16·6	3·5	0·58	2·1	0·35	6·6	1·1
Ferrous carbonate pills	12·5	17·8	2·22	16·0	2·0	31·0	3·8
Ferric chloride ..	34	1·2	0·4	0·6	0·2	1·5	0·5
Ferric and ammonium citrate	20	2·8	0·56	1·75	0·35	5·0	1·0

figures from tests on rabbits and guinea-pigs, owing to the relatively small numbers of such animals that can be used in toxicity tests, must be regarded as first approximations; the figures from the tests on mice have a greater accuracy, except those for iron and ammonium citrate, because with this product a great individual variation was found among the animals. Slopes of the regression curves, and the errors of estimating the LD50, which were of the order usually found in tests of this kind, were obtained by the graphical method of de Beer (1945).

It will be seen: (1) That the presence of small amounts of copper and manganese sulphates made no difference to

the toxicity of the iron or ferrous sulphate. (2) That the iron in ferrous sulphate, ferrous gluconate, and—curiously enough—iron and ammonium citrate had the same toxicity, though it must be repeated that the figure for the last compound is subject to a very large error. (3) That the iron in Blaud's pills has apparently only about one-quarter the toxicity of the other forms. It is, of course, well known that the iron in Blaud's pills has also much less therapeutic effect, and these two facts are undoubtedly due, at least in part, to the same basic phenomenon—the relative insolubility of their ferrous carbonate in gastric and intestinal contents. (4) That ferric iron appears to be up to twice as toxic as ferrous iron. We have no explanation for this finding, especially if, as is generally held, ferric iron is reduced in the stomach to the ferrous state. It must, however, be remembered that ferric chloride is a much more acidic substance than ferrous sulphate (or gluconate). The introduction of large quantities into the stomach must involve a considerable increase in gastric acidity, which in turn may hasten alimentary absorption of the iron—possibly an advantage with therapeutic doses but certainly not with toxic ones.

The observation with Blaud's pills suggested that sodium carbonate or bicarbonate might be useful as an antidote to toxic oral doses of iron compounds. Four rabbits were therefore given known toxic doses of ferrous sulphate (3 g. per kg. of body weight) and two of them then received the same amount of sodium carbonate. One of these two lived for two days, while the other survived completely; the two that did not receive sodium carbonate died overnight. This experiment was repeated twice, with similar results—a fact which points to the conclusion that sodium carbonate treatment might, if given soon enough, help to reduce the toxic effects of excessive iron doses by mouth.

Pathology and Histology

Rabbits

The rabbits used were of both sexes and weighed between 2 and 3 kg. They were fasted overnight and were then given by stomach tube doses of the iron compounds, graded and proportionate to their body weights. Two animals were used for each dose and at least ten animals for each substance. If the rabbits survived, daily samples of urine were collected for three days. Haematological examinations included differential and total counts of red and white cells and estimates of haemoglobin levels. Necropsies with examination of all major organs followed as quickly as possible after death. Sections were cut of parts of the stomach, intestine, liver, and kidneys, and were stained for iron as well as with haematoxylin and eosin.

Within a few minutes of receiving a toxic dose of iron the rabbits became prostrated. They lay on their stomachs with limbs extended, their respiratory rate increased, micturition often occurred, and reflex movement of the hind legs was considerably retarded. Coma followed, with shallow breathing and gradual disappearance of reflex movements. The animal either died two to six hours after receiving the dose (according to its size), sometimes following convulsions, or recovered.

The rabbits receiving Blaud's pills had a profuse diarrhoea. This fact, with the freedom of all other animals from this symptom, has, we believe, a very simple explanation. The pills are made by reacting ferrous sulphate with sodium carbonate, so that the ferrous carbonate formed must be accompanied by an equivalent amount of sodium sulphate. There seems no reason why a large dose of Glauber's salts should have an effect on rabbits differing from that on man. Moreover, the laxative effect of the associated sodium sulphate must have hastened the alimentary passage of these large doses of ferrous carbonate: this would tend further to reduce its toxic effects.

At necropsy the stomachs usually showed congested areas with shedding of mucosa, especially at the greater curvature. The amount of damage was to a large extent determined by the size of dose: the smaller toxic doses caused only very slight damage to the stomach wall. Bleeding into the stomach was the exception rather than the rule, but it was seen after the larger doses of both ferrous sulphate and ferric chloride and in one animal that had received ferrous gluconate. The small intestines generally showed much hyperaemia in their upper regions, but here also haemorrhages were seen only after very large doses. Surviving animals showed no evidence of kidney damage, the urine being invariably devoid of abnormal constituents. There were no departures from normal blood counts. Recovery of surviving animals was usually rapid.

Changes in the histology of stomach, liver, and kidney in rabbits killed by the iron compounds were very small, and appeared insufficient to account for the death of the animals. In the stomach there was only slight necrosis of the superficial layer of the villi and deposits of iron on the mucous membrane (occasionally also in the endothelium of the smaller blood vessels). There were deposits of iron in the bile ducts, but only slight hydropic changes in the liver. In rabbits surviving and killed three days after dosing we observed small foci of fatty degeneration, and necrosis was present in the peripheral parts of the lobuli, with deposits of iron, mainly in the Küpffer cells. The other surviving animals appeared to be completely restored to normal health and activity after a few days.

Guinea-pigs

The animals used, of either sex, weighed between 200 and 300 g. Their distribution over the different dosage groups was made so far as possible to equalize the average weights of the groups. Each dose was given to at least three animals, and at least ten guinea-pigs were used for each substance tested. The animals were fasted overnight and given the appropriate dose of iron compound by dropping it into the mouth and then tickling the fauces. Necropsies, dissections, and histological work were carried out as on the rabbits.

In general the immediate consequences of excessive iron administration by mouth were the same in guinea-pigs as in rabbits. At necropsy, however, there was evidence of severer damage to the stomach; macroscopically the findings with the larger doses resembled those described by Forbes. After doses of 1.5 g. per kg. of body weight of ferrous sulphate or ferric chloride the stomach contained both fresh and changed blood; necrosis, shedding of mucosa, and areas of haemorrhage were obvious to the naked eye. Severe irritation of the stomach wall followed the ingestion of 3 g. of ferrous gluconate per kg. of body weight: in one animal the stomach was full of blood-stained material. Changes were less severe after dosing with iron and ammonium citrate or Blaud's pills, but at the larger dose levels either preparation caused well-marked irritation of gastric mucosa with occasional petechial haemorrhages.

Histological changes, as in rabbits, were slight and insufficient in themselves to account for the deaths. There was but superficial damage to the gastric villi, with deposits of iron on the mucous membrane, which also showed some areas of capillary bleeding. In a very few instances there were some fatty changes in the liver.

Necropsies were not made on mice, which were used solely to obtain a reasonably accurate estimate of the median lethal doses.

Discussion

From the experiments described there can be no doubt that in very large doses certain soluble iron salts, whether ferrous or ferric, whether of organic or inorganic acids, and whether normally ionizable or complexes of the "scale salt" type, are toxic to at least three species of laboratory animals. It is reasonable, and probably a wise precaution, by extrapolation to accept as proved that all similar iron compounds can, in excessively large doses, kill mammals of any species, including man. It must, however, be emphasized that toxic doses really are excessive. The amount of ferrous sulphate necessary to kill on the average one out of two 10-stone (63.5-kg.) men, if man's susceptibility on a body-weight basis is assumed to be the same as that of the rabbit, would represent at least several hundred tablets of 3 gr. (0.2 g.) of exsiccated ferrous sulphate, each containing 1 gr. (65 mg.) of iron. Obviously the number may be considerably smaller for infants and young children, being reckoned in tens rather than hundreds.

The similarity in behaviour of various iron preparations suggests that after solution in the stomach they are all reduced to the ferrous state and that ferrous iron when present in very large amounts, whether wholly ionized or not, is alone responsible for the damage. Ferrous sulphate should be completely ionized at high concentrations, and ferrous gluconate probably hardly ionized at all even at low concentrations, yet they show indistinguishable toxicities in very high doses. It may be remarked, in passing, that none of the ionizable iron compounds exists as such in the stomach after therapeutic doses: apart from un-ionized hydrochloric acid in the gastric contents, there will then be present in solution the chloride, sulphate, and other anions, the hydrogen, iron, and other cations, and the various un-ionized soluble constituents. Forbes's contrasting of ferrous sulphate with ferrous chloride in solution therefore seems to be misleading even when the sulphate has been ingested at much above the therapeutic level.

The post-mortem and histological examinations have furnished no positive information about the *modus operandi* of iron at orally toxic levels. A decision between shock due to tissue damage—which at worst was not very great and appeared rapidly reversible in the milder cases—and systemic effects following passage of excess iron into the blood stream cannot be made on the basis of our experiments. They were, in any event, carried out with an immediately practical object—to find and record at what doses therapeutic iron preparations could exert toxic effects on experimental animals. The results of these experiments are reassuring. They show, at any rate in so far as the experimental animals react similarly to man, that the gap between curative and harmful doses of iron compounds is very large—and obviously still larger between preventive and fatal doses. Indeed, I doubt if there are many medicinal substances with so large a "therapeutic index." The upper dose of ferrous sulphate, according to the *British Pharmacopoeia*, is 0.3 g., which would be contained in five tablets of the product causing fatalities that led to this investigation. In few circumstances is it likely that an adult would be recommended to take more than 12 such tablets a day, and the results suggest the harmlessness of anything less than several hundred tablets taken all at one time and on an empty stomach. It is, however, desirable that physicians and pharmacists should warn parents and adults generally that iron preparations should be kept out of reach of the very young.

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AN EXPERIMENT IN REHABILITATION

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During the recent war, with its urgent demands for manpower, the attention of the medical services was sharply focused on to an aspect of clinical treatment that had under less pressing conditions been of relatively secondary importance. The economic aspect of medical or surgical treatment assumed an importance equal to that previously held by the somewhat ambiguous criterion of a "good clinical result." This is none the less true of to-day. The essence of the problem facing the clinician from the first day of treatment onward can best be expressed in the form of the question: How may this man be returned to his accustomed way of life and employment with a minimum loss of time and skill? The answer to that question embodies the full significance of the term "Rehabilitation," which must include the repair of the injury as well as the restoration of functional efficiency.

In industry to-day there are several examples of the successful handling of the problem of rehabilitation of the injured workman by a close liaison between medical and industrial authorities, the responsibility of treatment being shared equally between the two. Such schemes are at the present time too elaborate and costly to be undertaken by the smaller concerns. In this paper we have briefly described an experimental rehabilitation scheme carried out during wartime. We have attempted to underline the principles of treatment and to show how such a scheme may be applied to the industrial injuries of peacetime, with the minimum of special equipment, under existing factory conditions.

The Scheme

During 1945 and 1946, thanks to the co-operation of a near-by aircraft factory, a number of long-term Service and ex-Service cases drawn from the orthopaedic, plastic, and peripheral nerve injury units of Hill End Hospital were sent to work in the factory in chosen occupations. The choice of Service men, the majority complete strangers to factory life, was governed partly by the preponderance of Service casualties and partly by the special problem that they offered. As already stated, they were mainly "long-term" cases requiring a series of reconstructive operations or a long course of physiotherapy. It was thought that this experiment might have the double advantage of providing selected remedial exercises and, at the same time, a much-needed change of surroundings.

Sixty-nine patients took part in the scheme, spending an average of 63.9 hours at work over a period of seven weeks. Attendance at the factory was on four afternoons a week from 1.30 to 4.30, the mornings being left free for attention in the physiotherapy department. It was considered of the utmost importance that the scheme should be an adjunct to regular physiotherapy rather than, in any way, a substitute for it (see below).

Clinical control of the scheme lay in weekly factory "rounds" by the surgeon in charge of the case, the works medical officer, and the hospital rehabilitation officer, when the methods employed were discussed and criticized. The jobs, all of which came under the heading of unskilled work, were chosen from a large variety of industrial operations in accordance with the requirements of the disability. Some examples of these jobs are: bench assembly work, light assembly work in a warm electroplating "shop," drilling (using bench drill and single-spindle drill), hacksawing, Lister truck driving, preparation of fuselages, press operating, spray painting, and dismantling wrecked aircraft.

Many production operations, including those mentioned, demand movements which in certain conditions are of remedial value: the movements are for the most part both *repetitive* and *controlled*—two factors which count for a great deal in this connexion. Furthermore, by *simple* adaptation many of the jobs can be altered to suit the strength or range of the operator. Thus by varying the effective length of the operating lever the power required to work a drill may be stepped up or down. Again, by simple alteration of the *height* of the operating handle of a machine a gradual increase in range of, for example, the shoulder-joint can be encouraged.

This series of 69 cases included 53 of upper-limb injury, 46 (87%) of these resulting from gunshot wounds. The upper-limb injuries were various, and included a large number of disabilities which, from the point of view of rehabilitation, offered three main problems that could be summarized broadly under the clinical headings of joint stiffness, loss of muscle power, and muscle contractures. There were in this series no cases in which joint stiffness was present alone. In 26 cases (49.1%) it occurred in association with loss of muscle power, and in 10 (18.9%) it was present in association with both muscle contractures and loss of muscle power. Loss of muscle power was present alone in 11 cases (20.7%), was associated with muscle contractures in 6 (11.3%), and was associated with both joint stiffness and muscle contractures in 10 (18.9%). In no case was muscle contracture the only pathology.

(1) Joint Stiffness

Functional inactivity with resulting venous and lymphatic stasis is the most frequent factor in the production of post-traumatic joint stiffness (Watson-Jones, 1943). Prolonged inactivity results in irreversible changes occurring in capsular and ligamentous tissues, with the formation of intracapsular adhesions. Attempts to increase the range of movement by *passive forcing* of such joints often result in further damage to the soft tissues, with further limitation of movement. Bearing these precepts in mind, the problem of overcoming joint stiffness was approached mainly from the point of view of *active* mobilization.

One man had severe limitation of the elbow-, wrist-, and finger-joints as a result of seven months' immobilization and disuse of the right upper limb on an abduction frame for the treatment of a gunshot wound of the shoulder region which involved the brachial plexus. The patient was first put to work on light assembly in the electroplating shop, where the temperature is maintained at between 80° and 90° F. (26.6° and 32.2° C.). He was later transferred to hacksawing, an occupation requiring great muscular effort and involving all the joints of the upper limb, including the shoulder-joint. The hacksaw was modified by padding the handle to allow him to grip it firmly within the range of his metacarpo-phalangeal joint movement (Fig. 1). This produced a pronounced improvement of muscle

FIG. 1.—Patient using hacksaw with padded grip.

power associated with a greatly increased range of joint movement throughout the limb. As the metacarpo-phalangeal joint flexion improved, the padding of the handle was reduced.

The beneficial effect of prolonged active and resisted movements in a warm atmosphere was most marked.

A man whose fingers were almost immobile as a result of a gunshot wound of the hand responded notably to an occupation designed to give him active movements in a warm atmosphere. He drove a Lister truck on light haulage jobs within the factory precincts; the frequent stops and starts necessitated almost continual use of the clutch handle, which he operated with his injured hand, and which was situated in the stream of hot air from the motor.

Where the joint stiffness was not so severe less specific and controlled operations were applied. Among those which proved valuable was one in the salvage department where a spanner was the main instrument and a high degree of mobility of the hand was necessary.

(2) Loss of Muscle Power

Restoration of muscle power in cases uncomplicated by joint stiffness, flexion contractures, or nerve lesions offered few problems in treatment if a graduated scale of exercise was provided. When complicated by stiffness of joints the improvement of muscle power is no less important. "A stiff joint with powerful muscles is less disabling than a mobile joint with powerless muscles" (Watson-Jones, 1943). It was found that industrial operations designed primarily to increase joint movement might fail in this, but, as a result of increased muscle power, improve the efficiency of the joint within its limited range. Where loss of muscle power resulted from denervation atrophy more carefully graduated control of work done was required. Muscles showing return of voluntary power after recovery from a lower motor neurone lesion tire extremely rapidly, and it is advantageous to encourage the use of splints where possible. It must, however, be borne in mind that splinting in peripheral nerve injuries is designed to compensate, so far as is possible, for the paralysis and to encourage active

movement rather than to restrict movement. In a recovering radial or post-interosseous nerve lesion a "cock-up" splint not only releases the re-innervated wrist extensors from the effect of gravity but puts the antagonists at a disadvantage. The active contraction of the extensors of the wrist is in no way interfered with by this manœuvre.

(3) Muscle Contractures

A large proportion of patients treated in this scheme were suffering from peripheral nerve injuries. The frequent occurrence in median and ulnar nerve lesions of fibrous muscle contractures affecting flexor muscles of the forearm presented a special problem. Whether the fibrous contracture resulted from a true ischaemic lesion, a denervation atrophy, or a simple muscle destruction, the clinical picture varied only in degree. The principle adopted in treatment of these contractures was a gradual passive stretching of the muscle, using the wrist as the fulcrum, the fingers being maintained in extension throughout.

A patient who sustained a gunshot wound of the upper arm causing an axonotmesis (Seddon, 1942) of the median and ulnar nerves had a severe flexion contracture of the fingers of eighteen months' duration. When he started work on sandpapering aircraft fuselages his degree of contracture allowed him to work only on the upper surface of the fuselage (Fig. 2). He was encouraged to work down the curved surface of the fuselage, thus gradually and necessarily extending his wrist while maintaining the fingers in extension until, as shown in Fig. 3, the contracture was sufficiently overcome to permit him to sandpaper the side of the fuselage with his wrist in dorsiflexion. The result was achieved in 131 hours, covering a period of three months.

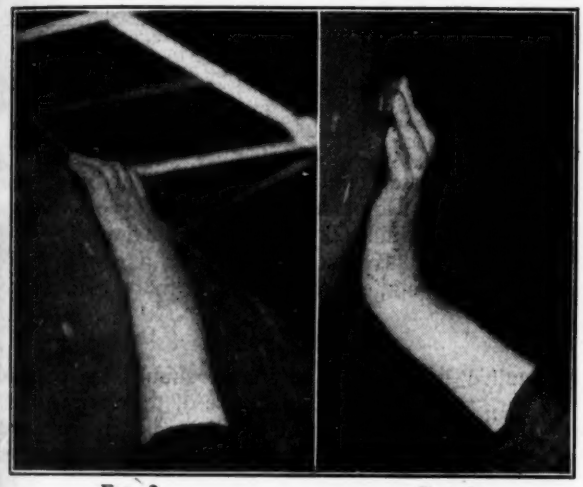

FIG. 2 FIG. 3

FIG. 2.—Patient sandpapering fuselage on its upper aspect. The wrist cannot be extended further without compensatory clawing of fingers. FIG. 3.—Showing wrist extension achieved after three months' treatment.

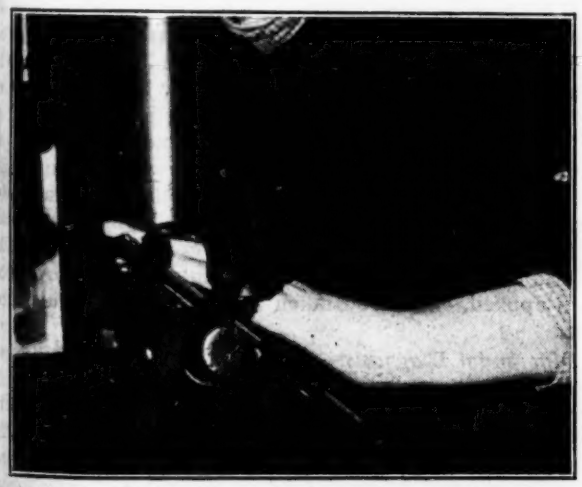

FIG. 4.—The hand in position on the adapted fly-press.

Another method employed to give a similar effect is shown in Fig. 4, which illustrates a fly-press with a modification plate attached to the handle. Forward pressure with the flat of the hand is required to operate the press, thus forcibly extending the wrist, the fingers being maintained in extension against the plate by a leather cuff. Over-extension at the metacarpo-phalangeal joints is prevented by means of a padded fulcrum placed behind the metacarpal heads.

Another patient gained 45 degrees of wrist extension with no further compensatory clawing in 117 hours during a period of three and a half months. In both cases corrective splinting was used, and daily physiotherapy was given over the whole period. When seen one year later neither case showed a recurrence of the contracture.

Comment

At first sight it would seem that the experiment described above can have little application to an industrial rehabilitation scheme. The patients were not factory workers and the injuries were in the main not those usually associated with industrial accidents. However, as we have already stated, most upper-limb injuries, whatever their origin, may ultimately present one or more of the triad of joint stiffness, loss of muscle power, and muscle contracture. Such differences that occur are mainly in degree. It is certainly true to say that the injuries dealt with in this experiment were more extensive and of longer standing than those commonly met with in industry. In the acute injuries of industry the problem confronting the surgeon is more likely to be prophylactic than remedial. That is to say, he will more often be concerned with the prevention of onset than with the treatment of the established triad.

We have already laid stress on the importance of the continuation of physiotherapy throughout the period of industrial rehabilitation, and provision was made that this side of clinical treatment was not interfered with. There are certain aspects of remedial treatment that can be carried out only in a properly equipped physiotherapy department and for which industrial rehabilitation can offer no substitute. For example, no amount of active movement of a limb will prevent ultimate fibrous-tissue replacement occurring in a denervated muscle which requires daily galvanism if rapid progressive atrophy is to be minimized (Bowden, 1945; Jackson and Seddon, 1945). There is evidence, however, that passive movement of the denervated muscle is beneficial in preventing the onset of muscle contractures.

In regard to mobilization of stiff joints, much can be done in the physiotherapy department, where the skilled application of heat in the form of wax baths or ray treatment, combined with careful active and passive movements, is in the early stages of greater value than any of the industrial methods. On the other hand, a variety of industrial operations offer unrivalled opportunities for encouraging active mobilization of stiff joints through the improvement of muscle power transmitted over them.

The modern occupational therapy department offers ample opportunity for improvement of muscle power, but in relation to an industrial accident service it has the obvious disadvantage of keeping the workman away from his work rather than getting him back to it. However, the occupational therapy department, with its varieties of hand looms, bicycle fretsaws, printing presses, etc., need not be very far removed from the concept of a hospital workshop equipped with a variety of simple industrial machines that might well

form as it were the "nursery slopes" from which the injured workman graduates to his own factory.

Although the inferences of this paper have been drawn from experience of "long-term" cases, much has been learnt about the possible application of such results to the treatment of acute injuries. Apart from the prophylactic aspect—the prevention of adhesions and loss of muscle tone—recently injured joints and muscles appear to respond rapidly to the controlled industrial methods of rehabilitation of this type. Furthermore, when the injury is of industrial origin the early return of the absentee to full-time or part-time selected work not only prevents a loss of skill and a lowering of morale that so often follows in the wake of prolonged unemployment but also tends to reduce the exaggerated importance attached by the workman to the accident.

Summary

This paper presents an experiment in the rehabilitation of injured Service men using existing conditions in industry.

The principles of treatment are discussed and illustrated.

From the inferences made the application of such a scheme to a peacetime industrial accident service is discussed.

We are indebted to Dr. W. J. T. Kimber, medical superintendent, Hill End E.M.S. Hospital, for help and advice on the organization of the scheme; to all sections of the De Havilland Aircraft Co., Ltd., for their willing co-operation; and to Mr. S. L. Higgs and Mr. Rainsford Mowlem for permission to publish the cases.

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ACQUIRED SYPHILIS IN CHILDREN

BY

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To the great increase in early syphilis during the war years may be attributed the emergence of cases of acquired syphilis in children. Six cases are here recorded in order to focus attention on the possibility that the disease is transmitted through close contact with actively infectious individuals, either adults or children, and by contact with infected articles, and on the possibility of such transmission occurring even in families where there are no known cases of syphilis. For example, several children have been brought for examination because they had picked up and inflated condoms found in the parks, and one of the cases reported may have been infected in this way. Poor environmental conditions, carelessness, and lack of attention to hygienic precautions are not invariably present as contributory factors, as infections through contacts have occurred in professional homes. The early recognition of these cases is of such vital importance, both to the child and to those in close contact, that acquired syphilis as a possible diagnosis should be considered in any case in which there is a rash accompanied by headache, sore throat, and adenitis, and where the rash does not conform to the commoner skin conditions or to one of the other exanthemata. The frequency of the commoner symptoms and signs of secondary syphilis in this group of cases is shown in Table II.

Unfortunately, in no case so far has syphilis been suspected while still in the primary stage, although a primary sore on the tonsil was detected in two of the secondary cases now reported. If a chancre appears on the lip, characteristically as a solitary indurated erosion with accompanying unilateral indolent rubbery enlargement of the neighbouring lymphatic glands, it should not be missed, and yet experience shows that suspicion is often not aroused until the secondary stage is reached. All the cases in the present series had had symptoms for three or four weeks before arriving at the clinic.

In the past five years six cases have been examined and treated. Tables I and II give the chief points noted. In

TABLE I

Case No.	Date Seen	Age (yrs.)	Sex	*T. pallidum* Demonstrated	Site*	Source of Infection
1	4/1/45	3½	M.	+	Anus	Mother
2	17/6/41	6	M.	–	—	Parents
3	14/8/45	7	F.	+	Labia	Indian servant
4	4/5/46	7	F	+	Vulva	Found condom in park; always sucks things she picks up
5	26/6/46	8½	F.	–	–	Parents
6	26/7/46	16	F.	+	Anus	Nephew with acute congenital syphilis

* Area from which serum (for demonstration of *T. pallidum*) was obtained.

TABLE II

Case No.	Malaise	Headache	Sore Throat	Pains in Limbs	Rash	Alopecia	Sore in Mouth	Adenitis	Condylomata Lata
1	+	–	–	–	–	–	+	+	+
2	+	+	+	–	+	–	–	+	–
3	+	–	+	–	+	–	–	+	+
4	+	–	+++	–	+	++	+	+	+
5	+	–	++	+	+	–	–	+	–
6	–	–	+++	–	+	–	–	++	+

each case the Wassermann and Kahn tests of blood taken at the patient's first appearance were strongly positive, and the cerebrospinal fluid, taken in all except one case within the first fortnight, gave entirely negative findings in respect of cell count, globulin estimation, Wassermann reaction, and gold-sol test.

Diagnosis

A detailed history of the illness should be obtained, noting particularly the time incidence of the various symptoms. As a rule malaise and anorexia are early symptoms, then follows the rash and sore throat with adenitis, the condylomata in the genital or anal regions being late in appearance. Should, however, the primary sore be on the mouth or tonsils, the first symptoms will be referred to this area, and in that case the associated glandular enlargement is very noticeable and is usually commented upon.

The family history should be obtained in full, with particular reference to whether the parents have ever had treatment for syphilis. An inquiry should be made as to who sleeps with the child and looks after him; whether he keeps his own towels and washing things; whether he uses outside lavatories; and whether he has been staying away from home recently. A thorough examination should then be carried out from head to foot, noting especially the condition of the hair and scalp, mouth, skin, glands, and genitals. Serum should be taken from moist lesions, after ascertaining whether antiseptics or ointments have recently been applied, and blood taken for Wassermann and Kahn tests.

Differential Diagnosis.—All the other infectious diseases associated with rashes must first be eliminated, particularly rubella, which was diagnosed originally in Case 2. The throat infection may also be suspected—diphtheria, Vincent's angina, and streptococcal tonsillitis with a streptococcal rash all being possibilities. In children the rash of

secondary syphilis may easily be mistaken for scabies with impetigo, pityriasis rosea, or toxic rashes in general. Case 4, with numerous early condylomata lata on the vulva, was at first thought to be a case of herpes genitalis. Glandular fever and subacute rheumatic fever should be taken into account when the particular features of adenitis and muscle and joint pains are prominent. It must be remembered, too, that more than one condition may be present at the same time—for example, scabies and a syphilitic rash. If, however, all the signs and symptoms, together with the family history, are taken into account, it is usually easy to make a probable diagnosis, and this can be confirmed at once if *Treponema pallidum* is demonstrated, or in a few days by means of a blood test. It is essential that the parents and all close contacts be examined and blood-tested immediately, and it is advisable to make monthly tests for three months after the last contact for those who have been caring for or sleeping with the child. This maxim is illustrated by the unusual story of Case 6.

Case History

A girl aged 16 was referred from the ear, nose, and throat department on July 26, 1946, with the diagnosis of primary sore of the tonsil, already confirmed by a strongly positive Wassermann reaction. She still showed typical ulceration of the right tonsil, with marked localized adenitis, but she also showed a generalized rash and adenitis and condylomata around the anus, in the serum from which *T. pallidum* was easily demonstrated. Her family—father, mother, and a sister aged 30 who slept with her—were all examined and tested and found to be negative, and it was a mystery how she had been infected, as she denied any other contact.

On Sept. 13—that is, seven weeks later—a little boy aged 20 months was brought to the department, again diagnosed before admission, this time at the Royal Hospital for Sick Children. In appearance he presented a large square head with bossing of frontal bones, a poor bridge to his nose, and sores on the tongue and lower lip, noticed since August. *T. pallidum* was demonstrated, and blood tests gave Wassermann +++, Kahn +++. He was a nephew of the above patient, and she often visited his home and was very fond of him. It was revealed that his father had had primary syphilis in 1938 while in India. He had been fully treated, and had been observed for two years, with negative tests. There had, however, been either a recurrence or a second infection following a further exposure in 1941, for his blood tests were found to give Wassermann ++, Kahn +, although he had no signs or symptoms. The mother of the boy—an intelligent, co-operative, and clean-living woman—had been previously married, with four children by the first marriage and two by the second. The youngest child was the patient, the older one was conceived before his father went to India and was healthy. The mother had had no signs or symptoms of syphilis at any time and appeared perfectly healthy on examination, but her blood tests gave Wassermann +, Kahn +, and after a provocative injection of neoarsphenamine, Wassermann +++ and Kahn +++.

The last member of this unfortunate family to appear was the 22-year-old stepsister of the boy. She reported on Nov. 9 with a history of having noticed swollen glands on the right side of her neck four weeks before, followed a week later by a sore throat and headache, and a rash six days before reporting. *T. pallidum* was demonstrated in serum taken from sores in the mouth, and from moist papules at the anus, and blood tests gave Wassermann +++, Kahn +++. She also was devoted to her small stepbrother and often kissed him. There had been no other possible contact.

Comment

This sad story emphasizes the necessity for examination of all close contacts as well as the parents in cases of both acute congenital and acquired syphilis in children.

Mention must be made of the treatment adopted in these cases. Although no routine dosage has yet been decided upon, every case was given parenteral penicillin in hospital in three-hourly doses, day and night, the total dose varying from 1,600,000 to 5,000,000 units per course. Case 3 received 1,600,000 units alone, and for a whole year has shown monthly negative blood tests, with maintained good health. All the other cases have received, in addition to the penicillin, at least one unit course of intramuscular arsenic and bismuth injections. Observation must be maintained for at least two years, with repetition of the cerebrospinal fluid tests before discharge.

We wish to express our gratitude to Dr. Batchelor for his help and encouragement in the preparation of this paper, and to Dr. Clark, the medical officer of health, for permission to publish the cases.

FACTORS INFLUENCING THE FUTURE PROVISION OF DAY NURSERIES

LONG-TERM POLICY

A statement by the Day Nurseries Committee of the Medical Women's Federation adopted by the Council of the Federation.

It should be the ultimate aim of a policy directed towards well-being in childhood that every mother should have the knowledge, means, time, and accommodation to bring up her own children in health and happiness within the family circle in their earliest years. It is recognized that after about the age of 3 years children benefit from contacts beyond the family circle, especially if the family is small or widely spaced. The provision of nursery schools (already part of the national policy) will increasingly meet this need where a mother is unable to arrange for it herself.

The full achievement of the aim of healthy happy family life in childhood is at present prevented by certain social disorders and conditions, and is likely to be so prevented for many years, probably even indefinitely. Among these social conditions may be mentioned: (*a*) inadequate housing and overcrowding; (*b*) circumstances which force the mother to be the sole or main bread-winner of the family (e.g., unmarried mothers, deserted or separated wives, widows, wives with incapacitated or unemployable husbands, etc.); and (*c*) difficult or bad home circumstances (e.g., illness or incapacity of the mother, poor parentcraft—from the physical or psychological aspect—poverty, drunkenness, etc.).

Day nurseries do not provide the social remedy for these conditions. They do, however, provide a means of alleviating the effects on young children. Other means are available also—as, for instance, home helps, carefully supervised daily minding, and direct financial assistance. Such methods, by retaining a more natural environment for the child, may well be preferable so far as they can be made available. But so long as these social disorders persist to any considerable extent, day nurseries, along with other methods, will be required on a scale commensurate with the extent and seriousness of these conditions in different localities, bearing in mind that for older children nursery schools will also play a part.

The provision of day nurseries should not be allowed to interfere with the radical measures necessary to abate, and not merely alleviate, these social evils—for example, better housing, adequate allowances, and more widespread teaching of parentcraft. As and when social conditions improve, so should health and happiness within the family circle become attainable for greater numbers of children and the need for day nurseries diminish.

For the social disorder of poor parentcraft day nurseries can provide a limited remedy as well as a means of alleviation. The children's life in a day nursery can be an object

lesson in child care, and in addition the nursery students are potential mothers. The number of actual or potential mothers who can be reached is extremely small relative to the total parent population. (Even in wartime less than 2½% of the children under 5 years old were in day nurseries.) The need to teach parentcraft is almost universal, and day nurseries absorb too much of the resources of personnel and money to make it practicable to attempt to use them on a scale sufficient to meet this need. It can be more completely met by other educational methods. Nevertheless, the concurrent effect in the teaching of parentcraft is valuable even though it may not be the primary purpose.

Short-term Policy

Two circumstances should be considered in relation to the immediate provision of day nurseries: (1) the present widespread prevalence of inadequate housing and overcrowding, and (2) the continuing demand for women in industry. The first of these, though it will also condition long-term policy, is of such seriousness at the present time as to merit special consideration in the continuance of nurseries on a short-term basis. To alleviate the effects of overcrowded and unhealthy housing day nurseries will be needed for a few years on a wider scale than should be necessary subsequently, when the true remedy of better housing becomes more widely available.

The continuing demand for women in industry during the present period of economic reconstruction and the "export drive" brings in considerations of national welfare only indirectly related to child welfare. At the height of wartime provision of day nurseries about 71,000 women were directly released to industry. Intermittent exclusion of children from the nurseries reduced the effective employment of the mothers by about 25%. A further 25% was offset by direct employment of women in running the nurseries. Thus, without taking into account the very considerable volume of labour indirectly employed in the maintenance of nurseries, the gain to industry cannot have been more than the equivalent of about 35,000 women. It must in fact have been very much less, and there may well have been a deficit. When it is remembered that nearly 4½ million men and women have now been released from the Forces, it will be realized that there can be no case for continuing to encourage the employment of mothers of young children, except possibly in certain industries depending mainly on female labour. Where such localized needs exist and are regarded as of importance in national welfare, they can probably best be met by the provision of nurseries in association with the industry concerned. Legislation should be introduced to bring such nurseries under the statutory supervision of the health authority. At present, nurseries that are privately maintained, whether by individuals or commercial firms, cannot be required to conform to any standards in such matters as staffing, premises, and equipment.

Further Considerations

In considering the place of day nurseries in the social services for mothers and children, whether on a long- or a short-term basis, certain further considerations merit attention—namely: (*a*) the provision of part-time occasional nursery care; (*b*) the need for mothers to be relieved of some part of the constant pressure of family cares; (*c*) the demand of some mothers to be enabled to work for their own satisfaction, apart from economic or national needs; and (*d*) the effect of day-nursery life on the health and well-being of young children.

(a) The Provision of Part-time Occasional Nursery Care

In the alleviation of some social disorders obviously only whole-time nurseries can help—for example, where the mother must be the bread-winner or when she is temporarily incapacitated; probably, also, in the worst instances of bad housing or home circumstances. The effects of many of the social conditions previously mentioned could, however, be considerably alleviated by arrangements for the occasional or part-time care of children, say for a few hours at a time on two or three days a week. Such arrangements can be made in association with an existing organization, as, for instance, a health or welfare centre or a community centre. The simpler set-up and the use of an existing organization allows of a greater number of children being reached relative to the resources employed—a point worthy of consideration when many children are living under unsatisfactory conditions, and when resources, particularly of personnel, are limited.

(b) The Need to Relieve Pressure on Mothers

Arrangements for the occasional care of children would particularly meet the well-recognized need of almost all mothers of young children for some relief from the unremitting pressure of family and household cares. Such occasional relief does not conflict with the ultimate aim that every mother should be enabled to bring up her own children within the family circle, but rather would help towards it. A mother can be at her best if she has the time and opportunity to preserve her personality as an individual citizen, and also time for companionship with her husband. Nursery schools will help, but where there are young children part-time nursery care is needed also. Time for companionship between husband and wife strengthens the family circle. Daytime care of children will not usually meet this need. The encouragement of group arrangements for evening "sitters-in" or "good-neighbour" schemes would help many mothers who cannot make their own individual arrangements to free themselves for at least occasional companionship with their husbands in the evenings. Mention should be made of the fact that family circumstances often arise when even whole-time day-nursery care cannot solve the difficulties—and still less, of course, part-time care. There is a most urgent need for the provision of short-term residential nurseries to meet domestic crises in families where there are babies and young children, particularly when adequate care cannot be given in the evening and at night. Although residential nurseries are outside the scope of this memorandum, the question is related to the family care of children, and attention is drawn to the acute need for more adequate means of meeting the difficulties of sudden domestic crises.

(c) The Right of Mothers to Work

A number of mothers who have no pressing need to undertake work outside the home nevertheless wish to do so for the sake of interest, companionship, or additional income, if they can make arrangements for the care of their children. The relatively well-to-do mother has been able to satisfy this wish at her own cost by employing a children's nurse or governess. The cost and the lack of available personnel and accommodation make such an arrangement generally impracticable. The cost of caring for a child in a day nursery, though substantial, is considerably less. It should be remembered, however, that day-nursery care takes children out of the family circle. The question is still further complicated by the present demand for women in industry. In a long-term policy, apart from national needs, should the community as a whole provide nursery places and shoulder all or any of the cost to enable a mother of young children to work because she wishes to do so? On the other hand, should any woman be denied the opportunity, available to others, of arranging her life in accordance with her own wishes? There is the question, too, of

possible loss to the community, one way or another, if a woman who is trained or skilled in certain work has to choose between that work and motherhood. For those women (and the number is probably not great) for whom a conflict exists between the claims and interests of motherhood and other work there is probably no completely satisfactory solution. A reasonable solution would seem to be that opportunity to work should be made available through nursery places, but that in such cases the mother, and not the community, should bear at least a substantial proportion of the cost, which the additional income would enable her to do without hardship.

(d) Effect of Day-nursery Life on the Health and Well-being of Young Children

The aim stated at the outset, that every mother should be enabled to bring up her own children within the family circle in their earliest years, is based on the conception of the family as the natural biological unit of human society. It is also strongly supported by knowledge of the benefits in childhood of family life at its best, and of the disadvantages of community life at too early an age.

It is generally recognized that the rate of development of the human infant is such that it is not until some time between the ages of 2 and 3 years that he is ready for more than occasional contacts beyond the family circle. Before that time he is physically and emotionally dependent on his mother, and needs the security of home and family life. It is unnatural and biologically unsound to separate a child from his mother and his home for long periods until he has at least begun to develop his independence. Some infants may be able to adapt themselves fairly readily to surroundings that are essentially unnatural, but others will suffer psychological trauma. It is well known that it is the children between about 9 months and 2½ years who present the greatest difficulties to the staff of a nursery. Prior to that age the difficulties are not so obvious because the child for long periods is unaware of his surroundings and appears to require little beyond attention to his physical needs in the intervals between sleep. Even at this age the lack of true mothering and of breast-feeding is a real deprivation to the emotional life of the child, the results of which may be difficult to foretell. Looked at purely from the psychological angle, group care of young children away from their homes is surely desirable only if the home is such that fear and insecurity replace the normal trust and security of family life—and this is, in earliest childhood, comparatively uncommon even in homes that from other aspects may well be regarded as unsatisfactory.

On the physical aspect of health and well-being a good deal of evidence has accumulated recently which is tending to modify the belief, widely held during the war, that in general children could hardly fail to respond well to nursery life, with its obvious advantages of good food, rest, fresh air, and supervision. The report of an investigation by the Medical Women's Federation (1946), based on the findings of seventy-three independent medical observers scattered all over the country, showed that there was a much higher incidence of respiratory infection among children of all ages in wartime day nurseries than among children living at home and attending welfare centres, and that although there was an improvement in weight and physique of the older children in the nurseries, no such improvement was manifest in the children under 2 years of age. Moreover, the investigation showed that the higher incidence of respiratory infection was not accounted for by significant differences between "home" children and nursery children at the start of their nursery life.

A report based on the records of nursery children and welfare-centre children in Oxford (Allen-Williams, 1945) showed similar findings; it also showed that infection tended to occur at an earlier age in nursery children.

A study of children in nurseries in Leyton (Menzies, 1946) revealed a high incidence of infection and unsatisfactory progress, especially in children under 2 years of age.

The report of a further investigation on behalf of the Medical Women's Federation (McLaughlin, 1947) records the findings in the examination, during a period of twelve months, of 557 day-nursery children and 641 children living at home, and shows that evidence of respiratory infection was two to eight times more common among the nursery children, that the higher incidence was manifest at all ages, and that the nursery children developed respiratory tract infection at an earlier age than did the "home" children. The results also showed that although the older children in the nurseries were heavier than "home" children in the same age group, this was not so in the age groups under 2 years. A finding of particular importance in this investigation related to measles, which was four times more frequent among the presumed susceptibles in the nursery group than in the home group. Moreover, the excess incidence in the presumed susceptibles was especially marked in the children under 18 months old (33.6% in the nursery group and 5% in those living at home)—an observation of great significance in view of the higher fatality rate of measles among younger children.

This accumulating evidence cannot be ignored. It has been suggested that even though infections in day nurseries are common, nevertheless the risk of serious ill-health is lessened, because day-nursery care leads to improved general physique and better resistance. There is at present no published evidence to support such a hypothesis. In fact, as has been stated, evidence shows that there is no improvement in general physique in the younger children, who are the ones most endangered by infection. It may be that the improvement in weight of older children gives grounds for expectation of improved resistance to serious ill-health, but at present proof is lacking. The children actually in a nursery are not a reliable criterion. Anything more than a mild manifestation of ill-health leads to exclusion of the child, and he may or may not return to the nursery. Those who are seen in a nursery are not the ones who have "stayed the course." Menzies (1946) reports that in the Leyton nurseries the records over a period of 3½ years showed that only 16% of the children who were admitted stayed in the nurseries until school age—and this at a time when there was every encouragement to mothers to leave their children in nurseries.

These considerations and evidence of the effect of group care on the emotional and physical health and well-being of young children have been reviewed at some length because it is realized that they conflict with a view that has been widely held—that day-nursery care is intrinsically a sound health service for children. There can be no doubt that for the younger children this is not so. For the older children there is still the increased danger of infection, but this may be somewhat counterbalanced by improved general physique and by the greater opportunity for mental development at any age when the child is ready for it, especially for those who might not otherwise have comparable opportunities.

The observations and investigations to which reference has been made relate to children in day nurseries, but there can be little doubt that they would apply to any congregation of young children, since group care inevitably increases the risk of the spread of infection. Nursery schools or nursery classes attached to primary schools (both of which cater for children of from 2 to 5 years) are being increasingly provided, and they may tend to be regarded primarily

from the educational standpoint. Due weight must, however, be given to the health considerations outlined above, and it is necessary to emphasize the need for continuous and skilled supervision of health and hygiene for children in nursery schools and classes no less than in day nurseries.

Conclusion

To sum up, day nurseries are needed principally as a means of alleviating the effects of grave social disorders which make it impossible for many children to have anything approaching a healthy or happy home life. But it should be clearly realized that group care—on its intrinsic merits, and social considerations apart—is not a sound health measure for young children, particularly those under 2 or 3 years old.

It is the realization of this fact and the recognition of the home and family as the natural healthy social background for a young child that warrant the aim already stated—that every mother should be enabled to bring up her own children in health and happiness within the family circle in their early years. The social disorders that stand in the way of achieving this aim should be directly attacked, and the provision of day nurseries should be regarded mainly as an interim measure of alleviation until the attack is successful and home life in early childhood can be widely developed at its best.

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A POSSIBLE MODE OF ACTION OF PENICILLIN

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Among the many theories suggested to explain the mechanism of drug action the concept that drugs act by metabolic interference has gained much prominence. The antibacterial action of penicillin *in vitro* and *in vivo* appears to be primarily bacteriostatic, inhibiting the growth of the infecting organisms by preventing cell division and multiplication. This is probably achieved by interfering with some metabolic function in the early stages of bacterial development or by acting as an ineffective substitute for some essential metabolite which may have the nature of an enzyme or a vitamin, or even that of certain active groupings in the cell such as the SH group, the NH_2 group, or a COOH group. Glucose utilization for energy production and cell synthesis is an inevitable metabolic reaction, and substances like nucleic acid, thiamine, riboflavine, nicotinic acid, tryptophan, uracil, etc., besides being essential growth factors in the case of typical parasites like *Staphylococcus aureus*, are also parts of the prosthetic groups of oxidation enzymes involved in cellular respiration. In order to elucidate the physiological characteristics of the antibacterial action of penicillin the influence of some of the above substances was studied, and the results obtained with nucleic acid, which is a major constituent of the bacterial cells, are recorded in this note. It may be added that McIlwain (1941) has demonstrated nucleic acid antagonism to the antibacterial action of the acridine derivatives, and Krampitz and Werkman (1946) suggest that penicillin may interfere with the metabolism of nucleic acids or nucleotides in the case of *Staph. aureus*.

Twenty-four-hour broth cultures of *Staph. aureus* were used in one loopful in duplicated sterile culture tubes containing a total volume of 10 ml., including nutrient broth and the test substance added in requisite amounts. The tubes were observed after twenty-four hours' incubation at 37° C. and the turbidity in the tubes due to bacterial growth was measured.

TABLE I.—*Showing the Influence of Penicillin and Nucleic Acid on the Growth of Staph. aureus*

Penicillin Alone (Units per ml.)	Growth in Broth	Nucleic Acid Alone	Growth in Broth	Penicillin (Units per ml.) and Nucleic Acid	Growth in Broth	Control in Broth
0·3	−	1/2000	+++	0·3 0·2 0·1 } 1/2000	+ ++ ++	+++
0·2	−	1/5000	+++	0·3 0·2 0·1 } 1/5000	+ ++ ++	+++
0·1	+	1/10,000	+++	0·3 0·2 0·1 } 1/10,000	+ ++ ++	+++
0·05	+	1/20,000	+++	0·3 0·2 0·1 } 1/20,000	+ + +	+++

Table I shows the remarkable fact that nucleic acid has no particular growth-promoting influence on the organisms but is strongly antagonistic to the bacteriostatic action of penicillin. In the presence of added nucleic acid the penicillin either did not inactivate or side-track the cell nucleic acid or, even if it did, the organisms could still thrive on the external source of nucleic acid, thus nullifying the bacteriostatic effect of the drug. That penicillin bacteriostasis of *Staph. aureus* is reversible in the presence of added nucleic acid is clear from Table II.

TABLE II.—*Showing the Reversibility of Penicillin Bacteriostasis of Staph. aureus by Added Nucleic Acid*

Penicillin (Units per ml.)	Nucleic Acid added to Broth after 3 Hours	Nucleic Acid added to Broth after 6 Hours	Penicillin Control	Nucleic Acid Control	Control in Broth
0·1	1/1000 ++ 1/2500 ++ 1/5000 ++	1/1000 ++ 1/2500 ++ 1/5000 ++	+	+++ +++ +++	+++
0·2	1/1000 ++ 1/2500 ++ 1/5000 ++	1/1000 ++ 1/2500 ++ 1/5000 ++	−	+++ +++ +++	+++
0·3	1/1000 ++ 1/2500 ++ 1/5000 ++	1/1000 ++ 1/2500 ++ 1/5000 ++	−	+++ +++ +++	+++

+++ indicates very good growth. ++ indicates fairly good growth. + indicates scanty growth. − indicates no growth.

Organisms that were exposed to penicillin and became non-viable could actually be rendered viable by subsequent exposure to nucleic acid. It is interesting to note that a strain of *Streptococcus viridans* and a strain of *Bacillus subtilis* gave exactly similar results.

Nucleic acid thus appears to be of paramount importance for the growth and multiplication of organisms like *Staph. aureus, Str. viridans, B. subtilis*, etc. Penicillin probably acts by interfering in some way with one or more phases in the metabolism of the organisms which involve nucleic acid function. Probably penicillin forms inactive complexes with nucleic acids which aid in the utilization of the energy material essential to the nutrition of the parasite, and when the inhibition is rendered reversible by nucleic acid addition the latter, besides making good the cellular needs, also helps to lower the effective concentration of penicillin, thus restoring the cells to a condition in which growth is again possible. Metabolic interference by penicillin in phases where nucleic acids play an important part

in cellular processes appears to be the prime factor in penicillin bacteriostasis. These studies are being pursued further.

We gratefully acknowledge our indebtedness to Prof. V. Subrahmanyan and Major K. P. Menon for their kind interest and helpful criticisms, and to the Council of Scientific and Industrial Research, under whose auspices this work is being carried out.

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Medical Memoranda

A "Fishing" Story

Strange cases come our way from time to time in surgical practice, but I think that the following case is worthy of record.

CASE REPORT

A Malay villager was admitted to the Malacca General Hospital on Feb. 27, 1947, in a very distressed state, with laryngeal obstruction. There was a marked stridor and retraction of the intercostal spaces. He was throwing himself about on the stretcher and was very difficult to examine, and of course quite unable to give any history. This, however, was freely and willingly given by about six of his relations simultaneously. It appeared that an hour previously the man had been drawing in his net in a rice field. Holding up the edge of his net, he peered over to inspect his catch, whereupon a fish leaped out of the water into his mouth and disappeared down his throat. All efforts on the part of friends and relations to dislodge the fish proving fruitless, it was decided to bring him to hospital.

On examination the tail of a fish could be clearly seen over the base of the tongue. This was grasped in sponge-holding forceps; but traction only resulted in the tail coming off, making matters worse than ever. The body almost filled the pharynx. Palpation revealed the fact that the long spiked dorsal fin of the fish was extended and firmly imbedded in the posterior pharyngeal wall, which was fast swelling up, and the patient was becoming cyanosed. He was taken to the theatre, his struggles being controlled by 5 ml. of thiopentone intravenously, and a low tracheotomy was performed. Breathing through the tube having been established, it was found that his jaws were firmly closed and could not be opened. He was therefore deeply anaesthetized by open chloroform over the tracheotomy tube, and the mouth opened. By forcing an index finger down alongside the fish the finger-nail could just reach the gill. Then by a process of "bipolar version," one finger inside and one outside the pharynx, the fish was "turned" from "breech" to "vertex" and successfully delivered. There was severe laceration of the posterior pharyngeal wall, which was swabbed with flavine and left to granulate. The tracheotomy tube was removed on the second day and recovery was uneventful.

The fish, which measured 13 cm. in length and 8 cm. at the greatest circumference, is known in Malaya as ikan betok. It frequently leaves the water, and is credited with being able to climb a tree. The Malay villagers affirm that when one is fishing for ikan betok one should "not laugh but keep one's mouth shut." The accompanying photograph shows its approximate shape.

I am indebted to the Director of Medical Services, Malayan Union, for permission to publish this case.

R. M. B. LOWIS,
Acting Surgeon, Negri Sembilan, Malayan Union.

A Case of Bilateral Syme's Amputation

The following case is published as a surgical curiosity rather than a recommendation for the revival of an obsolescent operation. It was of interest to me because, although I had never seen Syme's amputation performed and could not obtain advice as to the form of surgical boot necessary for the stump, I was able to get a man walking on two stumps with crude boots made by a local shoemaker.

CASE REPORT

An African adult male was brought into Tanga Hospital on Sept. 28, 1945, with a history of his foot having been bitten by a wild cat. He had been living for many years in a leprosy settlement maintained by the Universities Mission to Central Africa. On examination his general condition was good and he had a cheerful disposition, remarkable in a destitute person afflicted with a crippling disease. The left foot had been bitten through, leaving the metatarsals projecting from a mass of gangrenous muscle. The right foot was in the slow process of destruction by necrosis and ulceration often associated with leprosy. The fingers of both hands were stunted and deformed as a result of a similar process in the past. The wound was dressed daily with eusol and soon became clean. The metatarsals separated as sequestra, and a smooth granulating area covered the proximal half of the foot. On Nov. 21 a Thiersch graft was applied to this area and took well. It was hoped at first that it would be possible to get him walking on this stump, but the skin was too thin and soon ulcerated over bony points in contact with the ground. Moreover, the other foot was painful, and even with the aid of crutches weight-bearing was almost impossible.

On Feb. 1, 1946, I performed Syme's amputation of the right foot, as the sinuses showed little signs of healing. The head of the third metatarsal on dissection was found to be lying as a sequestrum in a cavity of brown pus. The wound healed by first intention and the patient was highly pleased with the result. The stump seemed so much more satisfactory than the skin-grafted left foot, complete with calcaneus and mid-tarsal bones, and I decided that a second Syme's amputation was indicated. On May 27 the left foot was amputated. Less skin was available to make a good flap, and part of the graft had to be incorporated in the line of incision. The stump healed after slight sepsis, but was not quite so satisfactory as the first.

Throughout his period in hospital he was encouraged to exercise his legs, and he had no contractures of knees or hips. He took part in our daily ward gymnastics to the strains of "Colonel Bogey" and "Blaze Away" played on the hospital gramophone. It was not until August, 1946, that a physiotherapist was sent to Tanga and systematic skilled attention became available. On Aug. 15 the patient first stood on his bare stumps and took a few steps with assistance in the ward. Meanwhile the problem of suitable boots had been under consideration, and at last I persuaded an Indian shoemaker to attempt something which finally looked like a pair of elephant hoofs (see photographs). These boots were fitted on Sept. 2.

FIG. 1 FIG. 2

FIG. 1.—After amputation, showing also the improved "boots."
FIG. 2.—The patient ready for walking.

For the first time for 13 years, one of which was spent in hospital, the patient walked unaided for a short distance. This was increased daily under the supervision of the physiotherapist. Unfortunately, in a few days the left stump became chafed by the rough leather inside the boot and threatened to ulcerate where the scar was close to the bone edges. The physiotherapist knitted him footless socks, and cotton-wool padding was inserted to protect the stump. He was then able to walk for about a quarter of an hour without fatigue, though he was unable to stand alone.

Shortly afterwards I was transferred from Tanga to a distant part of the country and have not seen him since. I last heard that he was progressing slowly and that it was difficult to persuade him to stay in hospital. What his ultimate fate will be it is impossible to foretell, but I think the immediate result is as satisfactory as could be expected. Where conditions of life are primitive there is still a place for primitive methods in surgery.

I wish to thank Miss Q. C. Brown, physiotherapist, for her assistance and the Director of Medical Services, Tanganyika, for permission to publish this case.

L. H. CANE, M.B., B.Ch.,
Medical Officer, Tanganyika Territory.

Reviews

POPULATION POLICY OF AUSTRALIA

Women and Children First! An Outline of a Population Policy for Australia. By Victor H. Wallace, M.D., F.R.C.S. (Pp. 350. 15s.) London: Geoffrey Cumberlege (Oxford University Press).

In a novel the scene and period of which were South-eastern Europe and post-war (the first German war) the author remarked that the number of banks in a city seemed to vary inversely as its prosperity. The number of books, papers, committees, and royal commissions considering the problem of population rises steadily as the birth rate declines. Dr. Wallace inevitably says many things which have been said before and accepts some postulates which can be challenged. It may be economically true that the population of Australia could be increased from its present 7.4 millions to 30 millions without harm to the standard of living; it is certainly true that this result cannot be achieved at the present rate of natural increase, and probably true that immigration is a very poor substitute for natural increase. But, as Sir David Rivett remarks in the "Foreword," it is not certain that the average individual of the 30 millions would be happier than the average in the present 7.4 millions. That, however, is another story.

Dr. Wallace sets out to explain how it might be practicable to reach a population of 30 millions. The special interest of his book is that he approaches the problems from the standpoint of an experienced medical practitioner. His contributions to new knowledge are (*a*) a study of the motives leading patients to seek his advice on contraceptive methods; (*b*) an informed criticism, from the medical point of view, of measures proposed, or which might be proposed, to stimulate growth of population. Dr. Wallace had kept records of his patients; he circularized some he had seen in recent years and personally questioned. When he had received 530 replies he closed the statistical inquiry. Dr. Wallace is not, and does not claim to be, a statistician. On the data provided in his book no statistician could judge whether Dr. Wallace's patients were a random sample of women desiring to limit their families, or even whether the patients who answered his questions were a random sample of Dr. Wallace's patients. Certainly some of the answers quoted (for instance No. 8 on p. 49) indicate a power of literary expression above the English average. But there is such a thing as common sense; we have no doubt that the author has more than an average share of that not very common quality and accept his sample, or selection, as instructive.

The first thing that strikes a cockney medical reader is that what these Australian women write about is what he hears every day from patients or friends: the difficulty of obtaining suitable accommodation, the aversion of landlords and of neighbours in flats to children, the impossibility of securing domestic help, the wearisomeness of shopping. At first youthful memories of books about bushrangers, billies, and gold-digging make this seem very odd; but if the reader is a statistician, or even a user of Whitaker's *Almanack*, he notes that of the 7.4 millions in Australia 3.6 millions live in the six State capitals (2.5 millions in the two cities of Sydney and Melbourne) and realizes that Dr. Wallace's patients have much the same problems to solve as Greater Londoners. Dr. Wallace's statistical analysis is not minute, but simple reading of his extracts from replies confirms the opinion of most medical men in this country that selfish love of pleasure is *not*, as some self-satisfied moralists preach, the prime factor of a declining birth rate.

And the remedies? Dr. Wallace's views on the medical care of pregnant women and on the organization of maternity clinics and community centres would be endorsed by most British doctors. When he turns to the general economic and social problems what he says is always sensible, but medical readers may possibly feel that neither he nor they are expert judges. He makes it *quite* clear that in Australia—as of course in Great Britain—State Socialism (practised by all political parties) has not gone far in reducing the heavy financial burden upon the parents of large families who wish their children to enjoy at least as much of the intellectual and material pleasures of life as they themselves had. He reckons (to take only one item) that the average cost of having a baby is approximately £64. To this the State contributes £16. There is some irony in the reflection that, if his analysis is right, the only State which does make a very substantial contribution to the cost of bearing *and* rearing children is Soviet Russia. Soviet Russia, it may be added, also encourages child-bearing and rearing by the award of "Honours," and Dr. Wallace thinks this psychologically sound. There is in Soviet Russia an Order of the Glory of Motherhood with three classes to be awarded to mothers who have reared 9, 8, or 7 children respectively. If rumour speaks truly, "Honours" are sometimes awarded in this country for less obviously valuable services, but one may doubt whether the Order of the British Empire could be so allocated as to encourage the birth rate. However this may be, Dr. Wallace has written a book which any doctor could read with advantage. Even those sections concerned with purely Australian problems are valuable to an English reader, for they teach him something about a great Dominion which he ought to know and probably does not.

MAJOR GREENWOOD.

TEXTBOOK OF HAEMATOLOGY

Principles of Hematology. By Russell L. Haden, M.D. Third edition, thoroughly revised. With 106 illustrative cases, and 167 illustrations, including 173 original photomicrographs and 95 original charts and drawings. (Pp. 366; illustrated. 25s.) London: Henry Kimpton. 1947.

We welcome a third edition of this book, for it is more suitable for the student than any of the other current textbooks of haematology. The author's approach is physiological and quantitative, and he teaches the student to think of the patient as a whole and not merely of blood pictures. The text is simple, and the diagrams, which Dr. Haden has tried and perfected by long years of lecturing, are ingenious and instructive. He includes some very good photomicrographs and some striking examples of a method of representing red cells in bas-relief. Dr. Haden first describes the normal haemopoietic system and the standard methods of blood examination. He gives a good account of the normal haemoglobin value and the meaning of "100% haemoglobin." In the next part of the book he discusses the mechanisms underlying the various blood disorders and describes the common forms of the latter. The final section consists of illustrative case histories. The principal new material in this edition is an account of the methods and results of sternal puncture.

The author seems to have omitted to revise several points. It is no longer believed that the pyloric glands in man secrete Castle's intrinsic factor: it is now thought to come from the fundus. Most haematologists would deny that the megaloblast is a normal stage of erythropoiesis in extrauterine life, and most would estimate the life of the red cell to be 100 rather than 25 to 30 days. Myelosis is a synonym for myeloid leukaemia, and in describing the production of agranulocytosis by amidopyrine it would therefore be better to speak of toxic myelopathy than of toxic myelosis. It is bad luck that this edition was prepared before the recent work was done on folic acid and the chemotherapy of leukaemia, for the new remedies allow a more truly physiological interpretation of treatment than has hitherto been possible.

L. J. WITTS.

THE CORONER

Sir John Jervis on the Office and Duties of Coroners. By W. B. Purchase, *M.C.*, M.B., D.P.H., Barrister-at-Law. Eighth edition. (Pp. 350. 30s.) London: Sweet and Maxwell.

Sir John Jervis brought out the first edition of this famous textbook in 1829. The last edition, published in 1927, was edited by the late Mr. F. Danford Thomas. Since then, in spite of much public discussion and a departmental committee, there has been no alteration in the law except for the temporary provision dispensing with coroners' inquests on air-raid deaths. Nevertheless, Dr. Bentley Purchase's eighth edition of this book is welcome, for he has had many years' experience both as a London coroner and as honorary secretary of the Coroners' Society of England and Wales.

The last three editions were written as an extended commentary on the wording of the relevant statutes—a form common in legal textbooks. Dr. Purchase has departed from that style,

with its unnecesary complication and repetition, and has arranged his material in narrative form, divided according to the various aspects of the subject. His first chapter, on the classification and appointment of coroners, reveals a surprising variety. All the High Court Judges are coroners *ex officio*, though none of them has ever been known to hold an inquest. There are still a number of franchise coroners, appointed by various corporations, lordships, universities, and other communities with this traditional right. The King's Coroner and Attorney holds an interesting historical sinecure; the Coroner of the King's Household has jurisdiction within the palaces. Apart from these, most coroners are, of course, appointed by local authorities under statute. Dr. Purchase deals fully with qualifications and disqualifications, jurisdiction, and duties, including the curious duty of inquiring into the circumstances of treasure trove. In his chapter on the report of deaths to the coroner he follows the traditional rule that every person about the deceased has a duty (unless the duty is imposed upon some particular person) to give notice to the coroner, his officer, or an officer of police. He admits that there is no sanction for the enforcement of this duty, but does not comment on the interesting opinion given by Sir Roland (then Mr.) Burrows, K.C., at the end of 1943 and discussed in the *Journal* (April 8, 1944, p. 498) denying that such a duty exists in law. He states that the medical practitioner has a social or moral obligation, which has become a well-founded custom, to report deaths to the coroner in suitable cases apart from his duty, which Dr. Purchase holds to be absolute, to issue a certificate if he has attended the deceased during his last illness, even though he cannot state the cause of death. In cases where the practitioner knows or suspects that the death is connected with a crime, Dr. Purchase quotes with approval Mr. Justice Avery's well-known charge to the Birmingham Grand Jury at the December Assizes in 1914, declaring that a practitioner with such knowledge should communicate with the police. That particular case was one of alleged criminal abortion, and medical and legal opinion on the judge's ruling has continued to be sharply divided until the present day. In his section on death under an anaesthetic he is impartial and does not support those coroners who would press anaesthetists and hospital authorities for notice and information which they are not strictly obliged by law to give. The book abounds with clear and accurate information and omits no point of substance. Half the volume consists of an appendix containing statutes, regulations, circulars, and forms, as well as a note on the emergency provisions in force during the war.

D. H. KITCHIN.

THE BRUNNER GLANDS

The Duodenal Glands of Brunner in Man, Their Distribution and Quantity. By Erik Landboe-Christensen. Translated from Danish by Hans Andersen, M.D. (Pp. 267; illustrated. 20s.) Copenhagen: Einar Munksgaard. London: Geoffrey Cumberlege (Oxford University Press). 1944.

Studies on the cells of the gastro-intestinal tract by precise quantitative methods are few in number. Exact knowledge of their function, variation in number and distribution, and modifications in disease is still relatively scanty. The author of this monograph set himself to answer one question: What is the distribution and glandular density of the Brunner glands in a representative section of the population? We may say that he has succeeded in answering it. His technique was a modification of that used by Malfoe and Hellman for the quantitative estimation of the lymphatic follicles in the intestine. He has thus accurately mapped out the distribution and glandular density in 53 patients, none of whom had duodenal scarring or ulceration. His results show the relative constancy of the distribution and a range of variation not appreciably altered in old age. The findings should form a valuable basis for future work on the exact physiological functions of these glands and their variation in disease.

W. T. COOKE.

Messrs. William Heinemann (Medical Books), Ltd., 99, Great Russell Street, London, W.C.1, inform us that they are the agents in this country for *Clinical Methods of Neuro-Ophthalmologic Examination*, by Alfred Kestenbaum, which was reviewed in the *Journal* of July 12 (p. 58). The English price of the book is 25s.

BOOKS RECEIVED

[*Review is not precluded by notice here of books recently received*]

The Chemical Activities of Bacteria. By E. F. Gale, B.A., Ph.D. (Pp. 199. 8s. 6d.) London: University Tutorial Press. 1947.

An elementary introduction for students of biochemistry and bacteriology.

Vital Statistics and Public Health Work in the Tropics. By P. Granville Edge, O.B.E., D.Sc. 2nd ed. (Pp. 265. 15s.) London: Baillière, Tindall and Cox. 1947.

Discusses the application of statistics under conditions peculiar to the Tropics.

Office Immunology Including Allergy. Edited by M. B. Sulzberger and R. L. Baer. (Pp. 420. 36s.) London: H. K. Lewis. 1947.

A survey of allergy and immunology for the general practitioner.

A Way of Life for the Handicapped Child. By Eirene Collis, M.C.S.P., M.A.O.T. (Pp. 183. 10s. 6d.) London: Faber and Faber. 1947.

The author describes her methods of treating cerebral palsy

Aids to Practical Nursing. By Marjorie Houghton, S.R.N., S.C.M., D.N. 5th ed. (Pp. 364. 5s.) London: Baillère, Tindall and Cox. 1947.

An introduction to nursing for the student nurse; with illustrations.

Unwanted Child. By Eustace Chesser, L.R.C.P.&S.Ed. (Pp. 152. 12s. 6d.) London: Rich and Cowan. 1947.

An account of the psychology and family background of unwanted children.

Diagnostic Examination of the Eye. By Conrad Berens, M.D., F.A.C.S., and Joshua Zuckerman, M.D., C.M., F.A.C.S. (Pp. 711. £4 10s.) London: J. B. Lippincott Company. 1946.

Describes a step-by-step procedure for examining the eye; with many illustrations, some in colour.

Surgical Treatment of the Soft Tissues. Edited by F. W. Bancroft, M.D., F.A.C.S., and G. H. Humphreys, M.D., Sc.D., F.A.C.S. (Pp. 520. £4 10s.) London: J. P. Lippincott Company. 1946.

Includes surgery of the subcutaneous tissues, hernias, blood vessels, and the treatment of burns.

1946 Year Book of Endocrinology, Metabolism, and Nutrition. Edited by W. O. Thompson, M.D., and Tom D. Spies, M.D. (Pp. 573. 21s.) London: H. K. Lewis. 1947.

Includes recent reports on thiouracil, radio-active iodine, and substances related to desoxycorticosterone.

The Essentials of Materia Medica, Pharmacology, and Therapeutics. By R. H. Micks, M.D.(Dubl.), F.R.C.P.I. 4th ed. (Pp. 399. 18s.) London: J. and A. Churchill. 1947.

This edition includes new material on anaesthetics and narcotics, tubocurarine, the antibiotics, benadryl, folic acid, and paludrine.

Recent Advances in Endocrinology. By A. T. Cameron, C.M.G., M.A., D.Sc.(Edin.), F.R.I.C., F.R.S.C. 6th ed. (Pp. 443. 21s.) London: J. and A. Churchill. 1947.

Includes an account of a case of Addison's disease successfully treated, and considers thiouracil and synthetic iodo-proteins.

Handbook of Diagnosis and Treatment of Venereal Diseases. By A. E. W. McLachlan, M.B., Ch.B., D.P.H., F.R.S.Ed. 3rd ed. (Pp. 375. 15s.) Edinburgh: E. and S. Livingstone. 1947.

Revisions include the discussion of penicillin therapy and its limitations, as well as oil-wax vehicles.

The American Sanatorium Association. By Lewis J. Moorman, M.D. (Pp. 72. No price.) New York: National Tuberculosis Association. 1947.

A brief historical sketch of the Association, with photographs.

Textbook of Pathology. By E. T. Bell, M.D. 6th ed. (Pp. 910. 50s.) London: Henry Kimpton. 1946.

This edition includes fuller discussion of vitamin deficiencies and tropical diseases.

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PLANNING AND WORLD POPULATION

Mr. Churchill may have wished to make our flesh creep when he suggested that starvation might lie ahead of us, but his observation was a useful reminder that for a long time now the people of Britain have been unable to feed themselves from home-grown produce.

When in 1798 Malthus[1] first propounded his theory that the increase of population would outstrip the food supply, Western Europe was just embarking on the industrial revolution. For the next hundred years manufactured goods produced by large-scale industry were sold to an underpopulated world possessed of enormous agricultural potentialities which could be exploited to provide cheap food for the ever-increasing number of European factory workers. Thus in the light of nineteenth-century economics Malthus was a false prophet. To-day his theory commands more respect.

When in 1940 the British Parliament passed the Colonial Development Act the more backward dependencies of the Empire were at last able to obtain money for schemes which were calculated to raise the standard of living of millions of people by giving them better housing, better water supplies, and improved medical facilities. By the provision of these amenities, among other things, the high infant mortality will be materially affected. The newer insecticides and paludrine will reduce deaths among young children from malaria; penicillin and the sulphonamides will prevent the deaths of young adults from pneumonia, while the same drugs will materially reduce the incidence of syphilis and gonorrhoea, those potent causes of abortion and sterility. Thus merely by chemotherapy alone, even if unsupported by universal education and intensive economic development, a considerable increase should occur in the population of the Tropics. When chemotherapy is backed by the various ameliorative schemes which Colonial Governments have now so eagerly put forward the increase in population may well be as great as that seen in England and Wales, where the population increased from 8,892,536 in 1801 to approximately 40,000,000 in 1931. Similarly, the population of India rose by 83,000,000 between 1921 and 1941, the total now being about 400,000,000; this increase occurred despite some 1,000,000 deaths a year from malaria alone. The highest recorded growth per annum was between 1931 and 1941, when it was 1.2%. An annual increase of 1% per annum means, it may be noted, that the population doubles itself in about 70 years, while if the increase is 1.5% per annum the population doubles in about 46 years. The views in regard to the effects of this phenomenal increase in the population of India so ably put forward by Sir John Megaw[2] in this *Journal* have been fully corroborated by the recent comprehensive *Report of the Indian Health Survey and Development Committee*[3] under the Chairmanship of Sir Joseph Bhose. Though they "recognize that the advance of science, careful planning, and the concentrated effort on the part of the community to develop the country's resources may make possible the support of a largely increased population on even a better standard of living than that which exists at present," they realize that "such measures can constitute only a temporary expedient, because a limit to economic productivity will be reached sooner or later, and uncontrolled growth of population must outstrip the productive capacity of the country."

A similar high rate of increase is probable in many parts of Africa. The Social and Economic Council of the Union of South Africa in their second Report[4] stated that for the period 1943–55 they have used as an estimate for planning purposes an increase in the African population of 2.3% per annum. Even though from a census taken in 1946 the actual increase for the decade appears to be only 1.58% per annum, this rate is greater than any hitherto recorded all-India figure. In the case of East Africa Paterson,[5] after careful consideration of all the relevant facts from Kenya, Uganda, and Tanganyika, comes to the conclusion that the rate of increase is now, or will soon be, about 1.5% per annum and that it is not improbable that within a few years the rate may be nearly 2% per annum, in which case the native population will double itself in 35 years' time.

If in these various countries of Asia and Africa this huge increase in population has occurred in the past with comparatively little help from medical science, what may be expected in the next decade, now that medicine has been armed with far more powerful weapons for reducing the death rate? There are four checks on the growth of population: war, epidemic disease, famine, and voluntary control of the birth rate. War with its atomic bombs and rockets will, unless it is prevented, take its toll largely from the highly industrialized urban populations of Europe and America; epidemic disease can with modern medicine and sanitation be localized and controlled. Famine and voluntary restriction of births are the two remaining factors. Anyone who has travelled extensively in India and in Africa must have seen how closely in many areas population is already pressing hard on the means of subsistence. The fertility of the soil is already becoming exhausted because of the absence of fallow, while the thin layer of fertile soil, deprived of its vegetation by the cow and the even more ubiquitous goat, is being washed away by tropical rains. Even if, as the Governor of Kenya[6] suggests, there is a radical reorganization of present systems of land use and agrarian methods, an

[1] Malthus, T. R., *An Essay on the Principle of Population as it Affects the Future Improvement of Society, with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and other Writers*, 1798, London.

[2] Megaw, Sir John, *British Medical Journal*, 1946, **1**, 343.

[3] India, *Report of the Health Survey and Development Committee*, 1946, 4 vols. Delhi.

[4] Social and Economic Council of the Union of South Africa *Report on Social Security, the Social Services and the National Income*, 1945, Pretoria.

[5] Paterson, A. R., *E. Afr. med. J.*, 1947, **24**, 81.

[6] Mitchell, Sir Philip, Despatch No. 44 of April 17 from H.E. the Governor of Kenya to the Secretary of State for the Colonies on *General Aspects of the Agrarian Situation in Kenya*, 1946, Nairobi.

ignorant man with a hoe, his wife, and his children are a totally inadequate foundation for an enlightened state of society, a high standard of living, and elaborate social services. Much less is such a family a secure foundation for the production of goods which can pay for the import of food from the few agricultural countries still possessed of an exportable surplus. There remains the hope that in tropical countries a rise in the standard of living may result in a fall in the birth rate such as is now occurring in Western Europe and America. Even if such a fall did begin at once it would rapidly result in the Tropics also in a great increase in the number of old and non-productive people who would have to be supported by the agricultural work of their children. It is doubtful, however, whether either in Asia or in Africa the birth rate will fall within a reasonable period in the face of prohibitive religious beliefs which form a fundamental part of the indigenous cultural pattern. Yet unless the birth rate falls in relation to the death rate and the population problem is solved much talk about colonial development and welfare is, to use an American expression, "whistling in the wind."

RECENT AMERICAN WORK ON POLIOMYELITIS

The present high prevalence of poliomyelitis in this country lends special interest to reports of recent work in the U.S.A. Workers in Baltimore,[1] using the Lansing mouse-adapted strain in rhesus monkeys, have shown that after intracerebral inoculation the virus can be found in the spinal cord on the day before paralysis at the time when histological lesions are first demonstrable. The concentration of virus is maximal within the next day or two and then falls rapidly. The concentration varies with the stage of the disease rather than with the extent of paralysis. Another Baltimore paper[2] shows that in vaccinated monkeys with high serum antibodies there is no antibody in the cerebrospinal fluid, the anterior horn cells, or in the visual cortex. In monkeys with paralysis resulting from intracerebral inoculation the converse is observed: antibodies are present in the anterior horn cells and the medulla where the virus has multiplied, and not in the visual cortex or, except sometimes in small amounts, in cerebrospinal fluid or serum. The antibodies appear eleven to sixteen days after paralysis and persist or even increase for four or five months at least. These antibodies in susceptible parts of the central nervous system seem to be responsible for immunity, and immunity to paralysis in man may be due to their presence after invasion of the central nervous system without paralysis. Prophylactic inoculations should, however, aim at producing high serum antibody levels, as these have been proved[3] to protect monkeys against intracerebral inoculations. Unfortunately the development of an effective vaccine for use in man is not yet in sight, because it would be dangerous to use the necessary large amounts of live virus and because human strains differ immunologically from one another and from the Lansing and monkey-adapted strains. This aspect is dealt with in studies at Yale[4] of subclinical poliomyelitis in chimpanzees in which immunity was produced to a homologous but not to a heterologous strain.

From Yale also there is an account[5] of poliomyelitis in Japan. Large epidemics had not been noted there till 1939, and the disease was thought to be uncommon. Yet the presence of a high endemic level was shown by an average annual mortality from 1923 to 1943 of 7.6 per 100,000, which is not much lower than the figure of 8.9 for the same period in the U.S.A. The presence of virus was also shown by a high incidence of paralysis in American troops in Japan. The age incidence in Japan is highest in the 0–5 age group, as it was when large epidemics of poliomyelitis first occurred in Sweden, the U.S.A., and Australia. A marked increase in the proportion of cases in the 5–15 age group has occurred in cities in these countries since 1930. The change is well shown by figures[6] for successive epidemics in New Haven, Connecticut. It was noted that in each epidemic the highest attack rates were in wards on the perimeter of the city and in nearby towns. No one ward was consistently attacked more severely than others, though rates were higher in wards adjacent to those heavily attacked in previous epidemics.

In a review[7] of the work on these and other problems in the epidemiology of poliomyelitis Sabin, who has been prominent in isolating virus from faeces, declares that spread occurs from faeces and not from the pharynx. In consequence he advises the use only of those control measures which will prevent transmission of the virus from contaminated faeces. He adds that control measures are not likely to check an epidemic though they may prevent the infection of a few persons who might otherwise be paralysed. However, other investigators[8 9] in the U.S.A. have stressed the importance of spread from the pharynx, and a valuable discussion[10] of the probable mode of spread led to the conclusions that nothing in the epidemiology of the disease is incompatible with spread from the pharynx and that spread may occur both from pharynx and faeces.

INTERPRETATION OF CHEST X RAYS

Many methods of investigation depend on personal judgments which often reveal a lack of consistency in classification between different observers and in one observer's consecutive grading of the same group. The clinical assessment of nutrition in children is a well-known example of this difficulty. Variations in judgment have also been shown in haematological and other studies. A team[11] working for the Veterans Association in America has recently demonstrated similar discrepancies in the assessment of *x*-ray films of the chest. In an attempt to determine the relative effectiveness of various techniques, 1,256 men had films taken by four different methods: "a 35 mm. photofluorogram, a 4 by 10 in. (10 by 25 cm.)

[1] Bodian, D., and Cumberland, M. C., *Amer. J. Hyg.*, 1947, **45**, 226.
[2] Morgan, I. M., ibid., 1947, **45**, 390.
[3] Morgan, I. M., Howe, H. A., Bodian, D., ibid., 1947, **45**, 379.
[4] Melnick, J. L., and Horstmann, D. M., *J. exp. Med.*, 1947, **85**, 287.
[5] Paul, J. R., *Amer. J. Hyg.*, 1947, **45**, 206.
[6] Wenner, H. A., *Yale J. biol. Med.*, 1947, **19**, 331.
[7] Sabin, A. B., *J. Amer. med. Ass.*, 1947, **134**, 749.
[8] Casey, A. E., and Fishbein, W. I., ibid., 1945, **129**, 1141.
[9] Smith, M. L., *et al.*, ibid., 1945, **129**, 1150.
[10] Maxcy, K. F., *Journal-Lancet*, 1944, **64**, 216.
[11] Birkelo, C. C., *et al.*, *J. Amer. med. Ass.*, 1947, **133**, 359.

stereo-photofluorogram, a roentgenogram on a 14 by 17 in. (35 by 42.5 cm.) paper negative, and a conventional 14 by 17 in. celluloid film." In each case the films were taken within a few minutes of each other. They were then assessed by five experts who before the investigation had collaborated in an attempt to reach some uniformity of nomenclature.

Comparison of the interpretations of the films by the five radiologists showed varying inconsistencies. The number of the full-size celluloid films found positive for tuberculosis varied from 59 to 100; altogether 131 films were described as positive. All five agreed that the film was positive in only 27 cases. Four were in agreement on 17 films, three on 17, two on 23, and in 47 cases only one observer described the film as positive. Further individual comparisons showed that from one-third to one-half of the films described as positive by one reader were negative according to the others. The radiologist with the smallest group of 59 positives had 31, 29, 37, and 14% of his positive films described as negative by the other four. The proportion of another reader's 100 positives labelled negative by the other experts varied from 42 to 50%.

The failure of the same individual to be consistent in his judgment was even more astonishing than the variation between different radiologists. All the films were assessed for a second time at a later date by the same five readers. The proportion of first positives regarded as negative on second reading by the same expert varied from 7 to 41%, and the proportion of the second positive readings which had been called negative on a first reading ranged from 6 to 19%. The radiologist who had 59 positives originally found an additional 23 on his second assessment, but missed 4 of his own first positives.

As might be expected from the variations shown by the individuals, a comparison of the four techniques gave large differences for the same reader. The one with 59 positives on the large celluloid film called 27, 30, and 24% of these positives negative when using the other three techniques. It seemed that each of the four methods had the same degree of efficiency, since at the second assessment all five readers missed almost the same number of cases in each of the four types of film. When a majority opinion was taken there was still a considerable discrepancy. Of the full-size celluloid films 61 were positive in the opinion of three or more readers but 10, 11, and 10% of the same cases were described as negative by three or more readers when the other three types of film were used. An attempt was then made to compare the relative efficiency of the four techniques by means of a total score. Since each person in the inquiry had four films assessed by five radiologists there were 20 verdicts for each individual. Of the 1,256 cases 994 had 20 negatives; 101 had only one positive reading out of the 20; 21 cases had all 20 readings positive; and 62 had an assessment from all techniques combined of 11 or more positives. In this last group the total number of positives recorded for each of the four methods were 259, 259, 259, and 250, out of a possible 310 (5×62) by any one technique. This analysis suggested that all four techniques were equally likely to pick out the cases requiring further study. The small-film techniques both gave a larger proportion of over-reading. Thus out of 101 cases with only one positive 46 were read on the 35 mm., 32 on the 4 by 10 in., 13 on the paper negative, and 10 on the 14 by 17 in. celluloid film. A similar order of technique was shown by the other small positive values.

This analysis showed that the various techniques were probably equally efficient. On the full-size celluloid film some useful supplementary detail appeared in a small number of cases. The differences between interpretations and techniques were due to a large extent to the failure of a radiologist to be consistent. Since mass radiography is being used increasingly often, these discrepancies need serious consideration if efficient screening of early cases of tuberculosis is to be attained. It seems essential that more than one radiologist should examine the films and that any case which one expert describes as positive or suggestive should be referred for further investigation.

RELIEF OF ANURIA

Many therapeutic claims based on single case records fail to withstand close analysis, either because essential data are lacking or because a multiplicity of therapeutic measures were used simultaneously. This applies particularly to measures undertaken to relieve anuria. The latter error was understandable when anuria was a desperate condition. The clinician knew that if the diagnosis had been made late he had at most three more days before a fatal outcome was to be expected. Life was too short and uncertain for art to be long. Diuretics like lactate, bicarbonate, caffeine, digitalis, sodium sulphate, and salyrgan were combined with procedures such as decapsulation, splanchnic block, or high spinal anaesthesia, often all in one unfortunate patient.

Recent advances have made it possible to view the onset of anuria more calmly. Both the artificial kidney devised by Kolff[1] of Kampen, in Holland, and the peritoneal lavage used by Fine[2] and his colleagues at Harvard allow us to prolong life by dialysing out of the circulating blood those substances responsible for uraemia. Neither of these methods, so far as we know, improves kidney function, although that is a possibility; they merely allow a longer period for natural or artificial restoration of renal function. As a rule, five hours on the artificial kidney will give a respite of two days. Peritoneal lavage is a slower procedure which, although technically easier, has more formidable complications, as has been pointed out by Fine himself.[3] The usefulness of both procedures has been confirmed in this country and it should now be possible to attack the fundamental problem of the anuria itself.

Perhaps the most important fact we already know about anuria is that it has many and different causes and that many cases remain completely unexplained. Labels such as "reflex anuria" or "renal anoxia" are of little value. Even in anuria due to a single cause, such as mismatched transfusion, some patients will die and others will recover without, with, or despite treatment. Advocates of a particular line of therapy will always find reasons for other people's failures: this measure was applied too early or too late, too vigorously or too gently, for too short a time, or without the right sort of adjuvant treatment. Only rarely are exact criteria used. One such rarity is the record by Talbot and his colleagues[4] of a unilateral decapsulation in a case of mismatched transfusion. The effects of this measure were observed by ureteric sampling and intravenous urography.

Criteria by which to judge the efficacy of these measures are comparatively easy to lay down when a proceeding can be carried out on one of a pair of kidneys—e.g., decapsulation, sympathectomy, or splanchnic block. They are far more difficult to establish for procedures affecting both kidneys—diuretics, spinal anaesthesia, or bilateral decapsulation. Reliance must then be placed on a close temporal relationship between the procedure and the diuresis, if any.

[1] *De kunstmatige Nier*, 1946 (abbrev. English version: *Artificial Kidney*), Kampen (Holland), J. H. Kok, N.V.
[2] *J. Amer. med. Ass.*, 1946, **130**, 703.
[3] *Lancet*, 1947, **1**, 120.
[4] *New Engl. J. Med.*, 1942, **226**, 228.

This involves a careful measurement of the rate of flow of the urine before and after, hourly or even half-hourly. Unless there is an immediate response, the chance that any later diuresis is due to coincidence alone becomes much greater. If failures were published, or even remembered, it seems probable that only a very small proportion of cases would ever be shown to "respond" to these measures. It would be interesting to know what this fraction is, and even more interesting to know how many of such cases recover without treatment. It seems improbable, however, that therapeutic scepticism will ever be sufficiently widespread to make this latter category large enough to treat statistically.

TOXIC EFFECTS OF MERCURIAL DIURETICS

The use of "salyrgan" as a diuretic is now widespread, and, the patent rights having expired, it has been included in the *British Pharmacopoeia* under the name of mersalyl. The official name indicates that it is a compound of mercury, and in view of the fact that mercury can be toxic it is surprising that mersalyl has maintained, in the main, so consistently good a reputation. The well-known German authority Volhard,[1] reviewing mercurial diuretics, said that for the treatment of the chronically failing heart the use of salyrgan, usually combined with strophanthin, had become indispensable; giving it weekly for many months he had never seen undesirable effects and had usually obtained entirely satisfactory results. Many similar statements have been made on its freedom from danger.

That an inherently toxic substance will eventually be found to cause toxic effects is, however, a reliable rule, and recently Oppikofer and Fehrenbach[2] published a paper on ulcerative mercurial stomatitis and necrosis of the jaw resulting from the use of the mercurial diuretics (salyrgan, "esidrone"). Esidrone was introduced by Ciba in 1938. The usual dose of esidrone, 2 ml., contains 44 mg. of mercury as compared with 76 mg. in 2 ml. of salyrgan. The signs of poisoning recorded by these authors are typical effects of mercury. They were observed in six patients: in five stomatitis with ulceration; in three necrosis of either the upper or the lower jaw or both; in two mercurial angina with ulceration; and in two mercurial dermatitis. In one patient salyrgan was to blame, in a second salyrgan and esidrone together, and in four patients esidrone. The doses were not excessive. The worst case was that of a man of 61, suffering from cardiac oedema, who was treated with about 20 injections of salyrgan over several months. He developed severe dermatitis and stomatitis, with necrosis of the upper jaw. When the salyrgan was stopped the dermatitis and stomatitis cleared up, but a serious jaw defect remained. Six months later the mercurial stomatitis flared up again, this time in the lower jaw, and he bled from the lingual artery.

The Swiss authors of this paper evidently know nothing of BAL (dimercaptopropanol) which was introduced by Peters, Stocken, and Thompson[3] during the war as an antidote to arsenical poisoning, and which has been shown[4] to be equally effective in mercurial poisoning. BAL is not yet generally available, though it has been supplied to V.D. clinics on application to the Medical Research Council. It will soon be in commercial production. BAL combines with mercury in the body and the combination is rapidly excreted. A patient receiving mersalyl will show, as the earliest sign of poisoning, excessive salivation. When this occurs mersalyl should be withheld and BAL given by intramuscular injection. It is interesting to note that even the acute forms of mercury poisoning can be arrested by BAL. Long and Farah[5] have shown that the sudden failure of the heart which occasionally occurs when mersalyl is given intravenously can be overcome by the intravenous injection of BAL, but recovery of course occurs only when BAL is given without delay. Acute heart failure from mersalyl very rarely occurs if it is given by intramuscular injection. Since the diuretic effect is intended to be of several hours' duration at least, this route is the more rational.

[1] Bergmann, G. von, and Staehelin, R., *Handbuch der Inneren Medizin*, **6**, 361. Berlin, 1931.
[2] *Schweiz. med. Wschr.*, 1946, **76**, 983.
[3] *Nature*, 1945, **156**, 616.
[4] *J. Pharmacol.*, 1946, **87**, Suppl. 85.
[5] *Science*, 1946, **104**, 220.

BLOOD GRAVITY AND HAEMOGLOBIN

The need for the control of intravenous infusion in war injuries led the United States Navy Research Unit at the Rockefeller Institute to develop the copper sulphate method for measuring the specific gravities of blood and plasma.[6] A drop of blood in a copper sulphate solution becomes encased in copper proteinate—and so remains discrete, and sinks or swims according to whether its specific gravity is greater or less than that of the solution. If drops of blood are let fall into a series of copper sulphate solutions of known gravity the drops will neither rise nor fall in the solution which has the same gravity as the blood. The specific gravity of plasma or serum is affected only by variations in the protein content, and the total plasma or serum proteins can be estimated as accurately by the copper sulphate specific gravity technique as by any other routine method. The gravity of whole blood depends on the plasma protein level and the number and specific gravity of the erythrocytes. If we assume a constant value for the erythrocyte gravity we can calculate, from the whole blood and plasma gravities, the ratio of red-cell volume to plasma volume—the ratio more laboriously but more accurately measured by the haematocrit. If we further assume a normal mean corpuscular haemoglobin concentration then we can calculate the haemoglobin level.

Since it is doubtful whether these calculations offer any substantial advantage over a simple haemoglobin determination in the treatment of shock and burns, the copper sulphate method has established itself principally as an accurate technique for the estimation of the total plasma proteins. There are occasions, however, when use can be made of the fairly close correlation between the whole blood gravity and the haemoglobin level. If we assume normal values for the plasma proteins, the erythrocyte gravity, and the mean corpuscular haemoglobin concentration, then the haemoglobin level can be calculated directly from the whole blood gravity, with an error of about ±10%. This is too great an error for individual haemoglobin estimations, but if we wish simply to pick out the anaemic members of a large group then the ease and rapidity of the method outweigh its inaccuracy.

The New York Blood Donor Centre used this method to "screen" prospective donors.[7] A drop of blood from the finger was allowed to fall into a copper sulphate solution of gravity 1.052; if the blood sank the donor was accepted; if it floated he or she was assumed to be anaemic, with a haemoglobin level under 12.3 g. Only 4% of donors were wrongly classified by this method. Hynes and Lehmann[8] made a similar application of the method. They showed that the blood gravity and haemoglobin were related more

[6] Phillips, R. A., Van Slyke, D. D., Dole, V. P., Emerson, K., Hamilton, P. B., and Archibald, R. M., *Copper Sulfate Method for Measuring Specific Gravities of Whole Blood and Plasma*. (Josiah Macy, jun., Foundation, New York. 1945.)
[7] *J. Lab. clin. Med.*, 1946, **31**, 40.
[8] *J. Physiol.*, 1946, **104**, 305.

accurately by an empirical curve than by the original linear calculation; only 3% of 270 men were wrongly classified as above or below a haemoglobin level of 11 g.

In practice, if further investigation of anaemic subjects is intended, it is wise to choose a copper sulphate solution corresponding to a haemoglobin level 1 g. above the chosen limit of anaemia. Then practically no anaemic individuals will be missed, though there will be a corresponding increase in normal subjects classified as anaemic.

TRAINING CLINICAL PATHOLOGISTS

What are the functions of a clinical pathologist? When this topic was debated in our correspondence columns a year ago attention was chiefly paid to diagnostic laboratory procedures, but, as the Association of Clinical Pathologists points out in a recent report, a function of increasing importance is "the control of treatments of various disorders whose progress can most accurately be assessed by laboratory methods." It emphasizes that a clinical pathologist should have a sound clinical training, including higher qualifications in medicine, as well as a wide experience of laboratory technique. The Hospital Surveys carried out for the Ministry of Health recognized the essential part that this specialty must play in a national hospital service, and there was, as Dyke[1] said commenting on them, "general agreement that satisfactory results cannot be attained by mere isolated examination and report on specimens, but only by direct consultation between practitioner and pathologist."

The Association of Clinical Pathologists appointed a committee in January of this year to consider the training and definition of consultants and specialists in clinical pathology. Its members were E. N. Allott (chairman), S. C. Dyke, R. W. Fairbrother, J. G. Greenfield, and W. H. McMenemey. The committee recommends that the five years after qualification should be devoted to gaining further clinical experience (one year), working in a university department (one year), and working in a department of clinical pathology (two years). In the remaining year the student should extend his experience as he wishes. The object of working in a university department is to train the student in scientific method and to introduce him to an atmosphere where research is being vigorously pursued; the committee suggests that students should be encouraged to take a diploma in bacteriology or in clinical pathology. While working in a department of clinical pathology in a large hospital or a group laboratory the student should receive training in all branches of pathology—a study that should include haematology, bacteriology, chemistry, and morbid anatomy. In this connexion the committee recommends that a special committee be set up to approve those laboratories suitable for this training. Those students who have obtained a first- or second-class science degree—for example, in physiology or chemistry—or a doctorate of philosophy should be eligible for recognition as specialists four instead of five years after registration.

The committee recognizes that these criteria cannot necessarily be applied to existing clinical pathologists or to some of those in training. It advocates, therefore, that at present recognized specialists should have been registered for a minimum of five years and have had at least four years' laboratory experience. They should also hold a higher medical or scientific qualification, or have contributed to the advance of medical or scientific knowledge. In accordance with a decision of the Royal College of Physicians the committee does not think that a register of specialists in clinical pathology should be compiled. Discussing the financial support that these years of training necessitate and whose lack often debars poorer students from undertaking them, the committee quotes the recommendation of the Royal College of Physicians Committee on Neurology that suitable candidates for the specialty should be supported by scholarships, Government grants, or otherwise.

[1] *British Medical Journal*, 1946, **2**, 95.

CARE OF THE AGED

The Nuffield Foundation is an outstanding example of that modern form of charity whereby help is made available at the point where it is most needed, instead of being frittered away in small sums that keep the wolf from the door only to fail when he jumps through the window. Even our most rigorous planners acknowledge that voluntary aid is desirable, and will remain so, if life is to be not merely sustained but made worth living. The Foundation's latest venture is to sponsor, in association with the Lord Mayor of London's National Air Raid Distress Fund, a National Corporation for the Care of Old People, under the chairmanship of Sir George Wilkinson, Bart., and to provide it in the early years with the sum of £500,000. The offices will be at 9, Mecklenburgh Square, London, W.C.1. Sir William Goodenough, speaking at the inauguration of the Corporation on July 28, explained that its primary function is to co-ordinate the many agencies that already exist for the benefit of old people. It will not assist individuals but will make grants or loans for schemes for old people's welfare, maintain an advisory service, establish and demand desirable standards for organizations applying to it for aid, and undertake research. Moreover, by offering grants or loans, it will take the initiative in areas where welfare for the old is lacking. The Corporation will be a complementary partner of the National Old People's Welfare Committee.

As the Rowntree Report[1] pointed out, the old more often suffer from loneliness than from dire poverty. The Nuffield Foundation has taken account of this in its 1947 Report,[2] and emphasizes that the community must not become stratified into large groups: provision for the old, in the interests of both old and young, must "be so planned that it is integrated into the life of younger sections of the community so as not only to enliven the surroundings of the older generations but also to enable the young to contribute in awareness and in activity to the welfare of the old." It would nevertheless be regrettable if widespread public arrangements for their welfare should diminish the sense of family responsibility to look after elderly relatives. The Report recognizes that many more suitable dwellings should be built for the old rather than experiments carried out on types of housing, of which enough have already been done. Discussing the dwellings themselves, the B.M.A. Committee on the Care and Treatment of the Elderly and Infirm[3] stressed that houses for the elderly should be decorative, situated where the residents have previously lived so that they may keep in touch with their friends, near churches and shops and places of entertainment—not "machines for living in," to use a phrase popularized by Le Corbusier, but homes. The Ministry of Health, too, has impressed on local authorities this aspect of housing the old. Voluntary aid is perhaps essential to provide this distinction, and the Corporation is well fitted to the task.

[1] *Old People*. Report of a Survey Committee on the Problems of Ageing and the Care of Old People, under the chairmanship of B. Seebohm Rowntree. Geoffrey Cumberlege, London, 1947.
[2] The Nuffield Foundation: Report of the Trustees for the year ending March 31, 1947. The University Press, Oxford, 1947.
[3] *British Medical Journal (Supplement)*, 1947, **1**, 133.

SURGERY IN TWO WARS*

BY

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Before comparing the surgical procedures, or the success which attended them, in the two wars of 1914–18 and 1939–45 it is necessary to consider the social conditions under which the troops existed and the differences in the types of warfare during the two periods. In 1914–18 the men lived in underground shelters, ill-ventilated, ill-heated, and, during the winter, frequently with cold and stinking mud up to the knees or above. The hygiene necessitated by this static war, and the hasty and inadequate burial of the dead, often in the walls of the dugouts themselves, led to insanitary conditions, horrible odours, and infestation with rats and vermin, which rendered life disgusting and almost untenable. Can it be wondered at that after being wounded men had no desire to return to these conditions? Little attention was paid to proper cooking and serving of rations. As a result the men's physical condition and resistance to infection was very poor.

In the 1939 war, once the period of waiting in France was ended by the German break-through, troops were continually on the move. This necessitated physical fitness and mental alertness and provided changes of scene and locality, which permitted of adequate hygiene. The thorough graduated training which the troops underwent at home before proceeding overseas acclimatized them to active service conditions. Such men were desirous and capable of an early return to the fighting front. Moreover, from the early days of the war attention was paid to the type of ration issued and its cooking.

Mobile Surgical Teams

It was difficult to deal promptly with surgical procedures in this very mobile warfare and the medical services took some time to devise a scheme whereby surgery would be available to the wounded within a few hours of injury. This was ultimately met by the formation of mobile surgical teams.

At first the over-enthusiastic, both medical and combatant, pushed isolated teams too far forward, forgetting that a mobile battle swayed to and fro over ten or fifteen miles, and that a solitary team was incapable of carrying on indefinitely and unable in the front line to retain its casualties after operation for that ten-day period so essential for full recovery. Later, therefore, mobile surgical teams were held at some distance from the battle area in groups of two or three to provide continuous service throughout the twenty-four hours. To ensure retention of patients for ten days and their adequate nursing (so much more efficient in the hands of women than of men) these teams were usually located at an advanced surgical centre with a casualty clearing station. Here such valuable adjuncts as female nursing, *x* rays, and blood transfusion were available.

As a general rule it may be said that specialists should not be advanced further forward than the C.C.S. with its advanced surgical centre, and that in the main they are better held at the base hospitals, casualties being dealt with in the field by general surgeons on certain well-defined principles agreed with the specialists. Possible exceptions to this rule are orthopaedic and thoracic units, which can under certain conditions be situated advantageously at the advanced surgical centres in the C.C.S. Here too is the best position for the blood transfusion, pathological, and *x*-ray units.

* Abridgement of a lecture delivered before the Royal Faculty of Physicians and Surgeons, Glasgow, on Jan. 29, 1947.

Blood Transfusion

One of the great advances of this war is the institution of blood transfusion—given forward and almost as a routine, though in the mud and blood of the average regimental aid post in battle it is dangerous and has been known to produce fatal septicaemia. As a general rule all blood lost should be replaced quantity for quantity and an extra pint (568 ml.) or even two pints administered subsequently; but in cases of shock where no haemorrhage has occurred blood must be given slowly and cautiously, not more than forty drops to the minute in rate. Seldom more than two pints (1.1 litre) in total quantity is necessary before the patient's pulse becomes perceptible within the limits of normality, indicating that transfusion should be stopped. Should this period be missed, a rising pulse rate and rapidly increasing respirations may lead to the erroneous administration of blood and plasma—often fatal in its results. The patient dies of pulmonary oedema or uraemia following blockage of the renal vessels with disintegrating and unexcreted red cells.

Chemotherapy

When the war started we had the sulphonamides, and full use was made of them. As a general rule it may be stated that their administration orally in doses of 1 g. 4-hourly for the first 24 or 48 hours and subsequently 0.5 g. 4-hourly until the infection is controlled, as shown by a fall in temperature and pulse, is far more beneficial than their local application to the infected wound. In staphylococcal infections they have little or no effect, and if their administration is not followed by a fall in temperature and pulse rate by the end of 48 hours they should be discontinued, for they are intensely toxic, especially to certain individuals.

About 1943 we were fortunate in obtaining penicillin. Applied locally, and provided it could reach all parts of the infected surface, it was adequate in clearing up local infection, and if applied to the recent wound was a satisfactory prophylactic if early and adequate surgery were combined with its use. Given systemically it proved of great value in combating general and local infection, and its results were almost miraculous against gas gangrene.

Surgery

The principles of war surgery remained essentially the same in both wars, though the lessons of the former had been largely forgotten in the interval. The damaging power of the missiles used in this war was much greater than those in 1914–18, though their concentration was much less. Severe lacerated wounds with considerable disruption of the surrounding tissues were commoner and more severe in the recent war.

The principle of operation within 6–10 hours, excision of a thin margin of skin and all damaged and infected muscle tissue until red contractile muscle with spurting vessels was encountered, held equally good in each war whether chemotherapy was applied or not. Chemotherapy is but an adjunct to early and efficient excision of every wound.

Primary suture and delayed primary suture—i.e., suture within the first three days after wound toilet—have been carried out on a large number of cases in all theatres of war (1939–45), and combined with routine chemotherapy, especially systemic penicillin, have resulted in successful healing in 80% of the cases in flesh wounds and 73% in lacerated wounds associated with fractures. Secondary suture, carried out under similar conditions, has had success in approximately 75% of cases in both classes of wound. These results are greatly in advance of those achieved by similar procedures in the 1914–18 war or the early stages of this war when chemotherapy was not available.

The mortality from multiple wounds, which occurred more often in this war than in the last, is considerably higher than in wounds involving one viscus alone (58.3% against 39.7%). Chemotherapy will in some cases permit a perforating wound of the abdomen or chest or head to be dealt with and a limb wound to be left for toilet until the following day, when the patient's condition has improved, but in many cases this is not possible because the multiple wounds involve head, thorax, and abdomen and all need urgent treatment.

Burns have been more common and more extensive in the recent war. It is difficult to obtain any figures of the mortality resulting from extensive superficial burns, since many died before reaching medical aid or, after first-aid treatment, before getting back to base hospital. Burns units subsidiary to the plastic units were of great value in the treatment of those burns which reached them, for an experienced team treats this sort of injury better than casual nursing can do.

Abdominal Wounds

In perforating wounds of the abdomen it is seldom that one viscus alone is damaged. Usually there are multiple wounds of the small intestine, often wounds of the larger intestine and the bladder, and perforation and disruption of one or more solid viscera, while abdomino-thoracic wounds are not uncommon, constituting about 12% of the total wounds involving the abdomen and thorax. In the 1914–18 war a perforating abdominal wound carried an overall mortality of 70–75%, and approximately 50% of those operated on recovered; in the 1939–45 war a similar wound carried an overall mortality of 50%, with a recovery rate of 30–35%. This better prognosis was partly due to the possibility of earlier surgery—owing largely, I think, to the lesser number of wounds occurring in battle to the proportion of surgeons employed in their treatment.

Suture of perforations is performed preferably unless the small bowel or its mesentery is greatly disrupted, when excision and anastomosis are carried out. In the case of large-intestine wounds, however, the 1939–45 war in its latter part saw a great advance in the routine exteriorization of the colon and the performance of colostomy in wounds of the rectum. This led to a considerable diminution in the mortality from these wounds. In the light of further experience it appears that exteriorization of the caecum and ascending colon is not only unnecessary but makes an additional risk for the patient as against those cases where such wounds are treated, like those of the small intestine, by primary suture. Furthermore the closure of the colostomy or restoration of the exteriorized bowel to the abdominal cavity is not entirely free either of immediate or of remote mortality.

Chemotherapy has improved the prognosis; but the introduction of sulphonamide powders into the peritoneum is fraught with the considerable danger of subsequent adhesions and intestinal obstruction and is not a practice to be indulged in with impunity.

The treatment of bladder wounds is by primary suture or, where other viscera are involved, by suprapubic cystostomy. The kidney is not infrequently damaged and usually needs excision. Splenectomy is generally required for wounds of the spleen. If severe, wounds of the liver cause a rapid death, and if slight seldom call for drastic surgical intervention. At all costs plugging, with a risk of subsequent infection, must be avoided. Abdomino-thoracic wounds constitute about 12% of wounds of the abdomen. As a general rule it is better to deal first with the thoracic lesion, suturing the wound of the lung and of the diaphragm, and then to tackle the abdominal damage.

Thoracic Wounds

It has been the practice in both wars to treat an uncomplicated haemothorax by aspiration alone. The complication of infection, frequently with fatal results, has occurred in both wars. Whereas in the 1914–18 war infection occurred in some 54% of cases of haemothorax treated conservatively, in the early part of the 1939–45 war infection occurred in 33%, with a death rate of 6%. With chemotherapy the infection rate has dropped to 6%, with a death rate of only 1%. Of all thoracic wounds approximately 10% were complicated by abdominal injuries. The death rate in these cases was considerably higher than in those of uncomplicated thoracic wounds (approx. 50%). In all wounds causing an open haemothorax early closure of the gap is essential; in the front line this can be achieved quite efficiently by a large dressing tightly applied. Such cases should not be treated by operation in front of the advanced surgical centre.

Comparison of Mortality

It is difficult to make an accurate comparison of mortality from wounds in the two wars, but the results of the average percentage mortality of the various wounds of abdomen and thorax are epitomized in the following table.

Percentage Mortality of Wounds in the Two Wars

1914–18	Organ	1939–45
51%	Perforating wounds of abdomen	39·7–47%
50–55%	Small intestine	32–40% { Suture 20% / Resection 58%
50–73%	Large intestine (colon)	36–40%
49%	Rectum	25–70%
61%	Stomach	29–38%
30%	Bladder	5–20%
29%	Liver	18%
26·6%	Kidney	5–45%
53%	Spleen	13%
65–85%	Abdomino-thoracic	27–60%
54%	Thoracic	5·7%

Fractures

In severe lacerating wounds involving bones the primary duty of the surgeon is the treatment of the wound with meticulous excision of all damaged muscle tissue. The reposition of the bone fragments in good anatomical position is of secondary consideration to this, which prevents the danger of gas gangrene and other infections. Routine administration of anti-gas-gangrene serum, chemotherapy, and fixation of the wound in plaster-of-Paris in extension are essential. Over-distraction of the fragments, a practice to which there has been an inclination in this war, just as much as the increased violence of disruption, accounts for the marked delay in union seen so often. Where main vessels are injured and nerves divided, and more especially if joints are laid open and muscle grossly crushed, it is a life-saving operation to perform immediate amputation, and, if a tourniquet has been applied, without its previous removal from the damaged limb.

Wounds of Nervous Tissue

The results obtained in treating injuries to peripheral nerves are much the same as those in the 1914–18 war. Primary suture without tension or torsion gives the best results, and this is now more often possible with adequate chemotherapy. Nerve grafting and other operations to try to restore gaps are of little value, and where a gap cannot be bridged by mobilization of the nerve it is better, if possible, to remove a section of bone in order to shorten the limb and permit suture. Secondary suture gives less satisfactory results than primary suture, but is still the practice of many surgeons. Where this is carried out it is essential to remove the neuroma which has formed round the ends of the divided nerve before suture is performed. The period of recovery is long—for instance, up to five years for a high sciatic lesion and two to three years for lesions of the nerves in the axilla or upper arm.

Head injuries should be dealt with by a surgeon specializing in brain surgery, and it is better to transfer such cases back after a routine toilet of the superficial wound. Wounds of the spinal cord are always disappointing in their results, but early surgery to relieve pressure on the spinal cord often brings about unexpected recovery of function. In all cases where paraplegia and retention of urine are present the routine and early performance of suprapubic cystostomy has been proved essential.

Gas Gangrene and Tetanus

The prophylactic use of anti-gas-gangrene serum and chemotherapy has done much to diminish the incidence and virulence of gas gangrene, but without adequate and early surgical removal of all damaged muscle tissue as a routine in every wound these aids to the prevention of gas gangrene are useless and dangerous. Tetanus has been relatively seldom seen in the recent war, which may be due partly to the more mobile warfare and absence of gross fouling of the soil; but one likes to think that the routine injection of tetanus toxoid has had much to do with the diminution of this scourge.

In this attempt to contrast the surgery of the two wars—a difficult and, as I shall doubtless find, contentious attempt—I am indebted to many colleagues for their assistance in obtaining the figures, and especially to Brigadiers Buxton, H. Edwards, and Fettes.

FRENCH RAILWAY (NORTHERN REGION) X-RAY TRAIN

BY

PIERRE LE GÔ, M.D.

Chief Medical Officer of the Northern Region of the French National Railway Company

In 1932 two railway coaches, one fitted with radioscopic and radiographic apparatus and the other as living quarters, were put into service on the Northern Region of the French Railways for use in the prevention of disease among members of the staff and their families. Railway rolling stock was chosen for this purpose, as offering reasonable comfort at a minimum operational cost.

In 1933 a "waiting-room" coach was added, and the three coaches were in constant use until the exodus of 1940. After a short interval the service was resumed in September, 1940, and continued until April 21, 1944, when the train was badly damaged during an Allied air raid on the sidings of La Chapelle, in Paris. Until new coaches could be provided the medical examination of staff and families, which in the circumstances then obtaining had become more essential than ever, was carried on by means of a portable radioscopic unit lent by the French Health Ministry and conveyed by road.

A new train has recently been completed at the French Railway workshops of Le Landy, just outside Paris. It is made up of two sections: (1) a radiological coach, a coach fitted up as living-quarters, and a coach fitted up as a waiting-room; and (2) a radiological coach which can function independently.

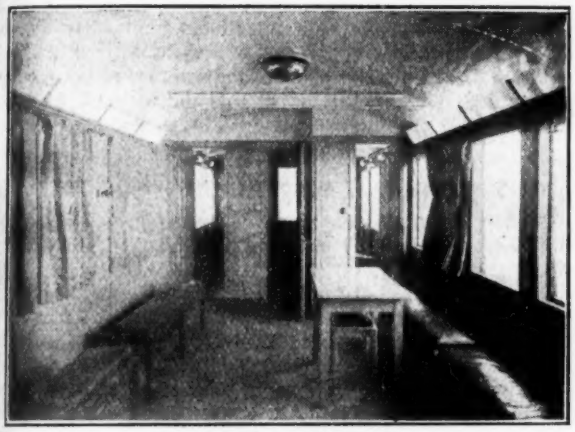

FIG. 1.—The waiting-room.

The radiological coach included in the first section comprises a small waiting-room with accommodation for twelve persons, two dressing cubicles which communicate on one side with the waiting-room and on the other with the doctor's consulting-room (equipped with a couch for examination purposes), a radiological room fitted with radioscopic and radiographic apparatus, a laboratory for developing *x*-ray photographs, and finally an attendant's compartment with a collapsible bunk. The living coach provides quarters for the doctors and nurses, and includes a kitchen, a dining compartment accommodating 6 persons, 2 bedrooms for the doctors and 2 for the nurses, and 3 dressing-rooms with lavatory. The waiting-room coach has seating accommodation for 54. The interior fittings are very simple, and include hinged benches with collapsible backs which can be turned up against the sides of the coach to facilitate cleaning, two lavatories, and an alcove containing a boiler for central heating. It may be mentioned that special fluorescent lighting has been fitted into this coach.

The Medical Service plans to use this coach also for meetings, to give lectures on welfare, etc., to the families of the staff, and to serve teas to the children. For this purpose alternate benches can be replaced by tables.

Equipment of the Train

Section 1.—The system of heating is the same for each coach, with a self-contained unit feeding the radiators, the size and number of which have been fixed to give the requisite temperature for each room, according to its use. Current for electric lighting can be obtained in each coach alternatively from a self-contained 24-volt unit or from a 110-volt main supply when the coaches are stationary. Otherwise the equipment follows standard practice, although it may be mentioned that red, blue, and white concealed lighting has also been installed. The radiographic apparatus is supplied with current obtained from a hook-up with the 110-volt main supply circuit. The apparatus, with which examinations can be made in both vertical and horizontal positions, is the one which was in use until 1944, and is of an old but reliable design. It has, however, been improved upon, and appropriate precautions have been taken to protect the doctor and assistants against the danger of high-tension current. Special precautions have also been taken in order to avoid the risk of damage to the radiological apparatus while the train is in motion.

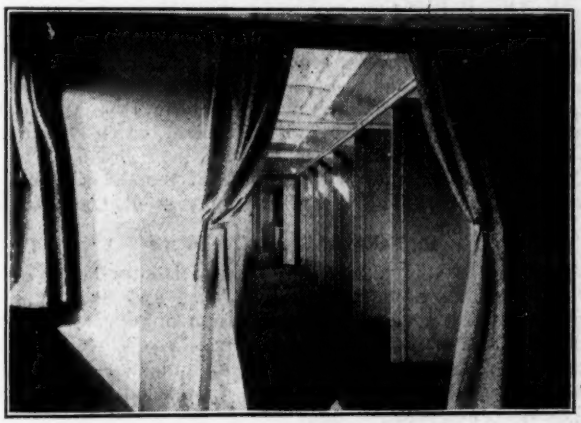

FIG. 2.—The dressing cubicles.

Section 2.—This section consists of one coach, which can function independently or simultaneously with the first. It is equipped so that examinations can be effected with considerable rapidity. It comprises a waiting-room (Fig. 1), 14 dressing cubicles arranged in two groups of seven on each side of a central corridor (Fig. 2), a consulting-room for the doctor (Fig. 3) equipped with a desk and a couch for more thorough examinations, and a radioscopic room from which the nurse can communicate with the doctor by telephone. In this way the doctor can transmit his diagnosis to the nurse, who can in turn give to the doctor the case-history of the patient from the health-card.

The medical staff are protected against the action of rays by a leaden screen fitted between the apparatus and the nurses' office (Fig. 4). The radioscopic apparatus, which is very up-to-date, has been designed for systematic mass examination, and includes: (1) A vertical radioscope, fitted with a leaden partition screen to protect the operator against direct radiation. This machine is of particular interest inasmuch as the patient can be examined in the light and can move about freely, the

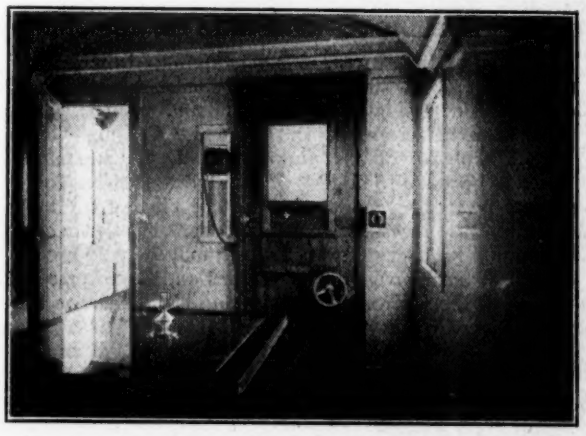

FIG. 3.—Doctor's consulting-room, showing *x*-ray screen.

operator alone being in darkness. This is a very desirable feature, as it considerably reduces the time taken for each examination. (2) An *x*-ray generator specially adapted for this type of examination and giving a very clear and detailed picture. It is designed for use off the main supply or from the rotary convertor. Its capacity is such that examinations can be carried on for hours at a stretch. (3) Finally, there is a switch-gear control for the generator. The whole of the electrical equipment can be worked off the main supply or a generator.

Its Value in Preventive Work

By means of this radiological train it is possible to carry out examinations of both the railway staff and their families, particularly with a view to the prevention of tuberculosis. By travelling from station to station the benefit of these examinations is extended to employees living in small localities where there is no qualified lung specialist. In this way it completes the work being done continuously in the eight tuberculosis centres of the Northern Region of the French Railways by means of existing installations. As 600 people a day can be dealt with in this train it will be possible to examine every member of the staff of the Northern Region of the French Railways and their families at least once a year.

Useful and profitable as this work is, the Medical Service has decided that the prevention of tuberculosis should not be its sole object. It is intended to carry out on each subject a thorough and complete annual examination covering the whole

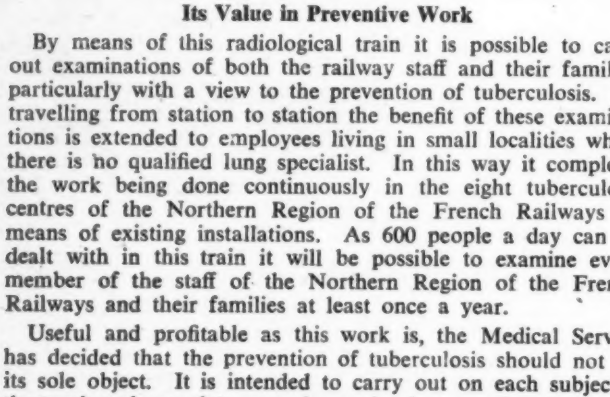

FIG. 4.—Nurses' office, showing examinees' side of *x*-ray screen.

body. To this end it is planning the addition of a further coach to the radiological train, completely equipped for a rapid examination of the different organs of the body. Thanks to the facilities offered by this new coach, the person examined will undergo measuring, weighing, blood-pressure test, analysis of urine, examination of the heart, and reflexes of the eyes and ears, as well as a blood test and cardio-pulmonary radioscopy. The results of these examinations will be recorded on case-history cards, which can be mechanically sorted and classified.

COLONIAL MEDICAL RESEARCH STUDENTSHIPS

In the *Journal* of June 21 (p. 897) we announced the institution by the Secretary of State for the Colonies of ten research studentships for graduates in medicine and cognate sciences. We have received an amendment from the Colonial Office to the second sentence of the announcement, which stated the allowance to be made to holders of the studentships, as follows: A graduate awarded a studentship will be eligible for a maintenance allowance assessed according to personal circumstances. The maximum rates of allowance which may be paid are: £260 per annum at the Universities of Oxford and Cambridge; £250 per annum at the University of London; and £220 per annum at other universities in the United Kingdom. The allowance will be free of income tax. A studentship will normally be awarded for a period of two years, subject to satisfactory report at the end of the first year's work from the supervisor, who will be nominated by the Colonial Medical Research Committee.

WORLD FEDERATION OF PATHOLOGISTS

The European Association of Clinical Pathologists, under the Presidency of Dr. S. C. Dyke, met at Cambridge on June 27 and reconstituted itself as a World Federation of Societies devoted to Clinical Pathology. The Federation defines its aims as (1) to develop clinical pathology—the application of pathology and allied sciences to medicine; (2) to have regard to the scientific and professional status of those engaged in its study and practice; and (3) to foster international amity. A committee was appointed to call a meeting of delegates from as many interested associations as possible in Paris next November, during the meeting of the French Société de Biologie Clinique, in order to formulate a constitution and elect officers. Dr. Dyke was appointed chairman of the committee, Drs. W. H. McMenemey and J. Ungar joint secretaries, and Dr. R. Cruickshank (London), Prof. Raoul Kourilski (Paris), and Dr. F. Pick (Prague) advisory members.

The Federation hopes to gain a world-wide membership, and invites societies devoted to clinical pathology to communicate with the secretaries—either Dr. W. H. McMenemey, the Pathological Department, The Royal Infirmary, Worcester, or Dr. J. Ungar, Glaxo Laboratories, Greenford, Middlesex. The Czechoslovak Association of Clinical Pathologists, the French Société de Biologie Clinique, and the Association of Clinical Pathologists of Great Britain have already signified that they wish to join the Federation. Medical practitioners or university graduates practising clinical pathology who are members of the constituent bodies will thereby become members of the Federation. Membership is also available to those who are eligible but do not belong to a constituent body. The Federation proposes to hold a conference at least once in every three years at the same time and place as the summer meeting of one of its constituent bodies. It hopes that the first will be in the summer of 1948.

THE MEDICAL PROTECTION SOCIETY

The London and Counties Medical Protection Society, at an extraordinary general meeting on July 16, agreed to simplify its title by omitting the prefix "London and Counties." Sir Ernest Rock Carling, who took the chair at the annual meeting which followed, said that the Society had had a very successful year. New members joining in 1946 numbered 1,894, bringing the total membership to over 22,000. The work of the Society had also increased. Applications for advice and assistance were received during the year in 1,410 cases. The Society had had to meet heavy legal expenses, and it had been again brought home to it that even the most expert and careful doctor sustained misfortunes or committed errors which might result in heavy damages. Moreover, the general costs of litigation tended to increase.

The Society was constantly hampered in its work by the failure of practitioners to keep records. He commented on what seemed to be the tendency of judges to attribute the blame for the effects of a disease or injury to the unfortunate doctor who had had the case in his care—not merely the portion of blame which might be put at his door owing to some lack of skill or error in treatment but the blame for the entire disability—and this was often reflected in the costs. Perhaps the most important activity of the year was the part taken by the representatives of the Society in making representations to the Ministry of Health concerning the Bill now being promoted by the General Medical Council for the reform of its constitution and procedure.

The treasurer, Mr. W. M. Mollison, submitted the accounts, which were in a thoroughly healthy condition, the investments amounting at cost to over £100,000. Sir Ernest Rock Carling was re-elected president, and to fill vacancies among the vice-presidents caused by certain retirements Dr. Thomas Beaton, Mr. F. A. Juler, and Dr. G. M. Stoker were elected. The new members elected to the Council were Dr. Annis Gillie and Dr. F. H. Stevenson.

The offices of the *American Journal of Ophthalmology* have been moved from Cincinnati to 700, North Michigan Avenue, Chicago, 11, Illinois.

PURE AND APPLIED CHEMISTRY

ELEVENTH INTERNATIONAL CONGRESS

The proceedings of the Eleventh International Congress of Pure and Applied Chemistry, held in London from July 17 to 24, covered a wide variety of topics of medical interest. Joint meetings between sections primarily concerned with human beings, animals, and plants proved of special value. Sir Henry Dale's congress lecture on "The Part of Chemistry in the New Therapeutics" was published in our last issue (Aug. 2, p. 161). The report which follows excludes also discussions on bacterial chemotherapy, the principal points from which were summarized last week in a leading article (p. 179), and the reported discovery of a lactation vitamin which was the subject of an annotation (p. 181).

Intermediary Metabolism

A discussion on intermediary metabolism held by the Section of Biochemistry provided further evidence of the large part which radio-isotopes may be expected to play in future investigations of this type. Prof. G. von Hevesy's laboratory in Copenhagen was the first to introduce this method for the purpose of directly measuring the replacement rate of phosphorus in the teeth of the rat. He has now used the same radio-element (P^{32}) to study the phosphorus metabolism of the blood, while with radio-nitrogen (N^{15}) he has determined the average lifetime of human red corpuscles as about 4 months and that in the case of the hen as 30 days. This work appeared as an interesting supplement to that carried out in the United States with the two radio-irons on blood storage and transfusion, and Prof. Hevesy presented a reasoned analysis of the research uses of these four radio-isotopes. Radio-iron, he pointed out, necessarily involved the metabolic complication of a donor, and it had been shown also that the iron released in haemolysis was largely used in the formation of new cells. With radio-phosphorus, on the other hand, corpuscles could be "labelled" *in vitro* and re-injected into the original subject. In this way it had been shown that there was a high interchange rate both of inorganic phosphorus as between serum and red cells, and of inorganic and organic phosphorus within the cells. For the purpose of cell life measurements in the case of the hen, use has been made of the fact that the desoxyribose nucleic acid of the red cells remains unchanged during the lifetime of the cells. It has been shown that all red cells in the hen have about the same lifetime. The corresponding human measurement, yielding the 4 months' lifetime already quoted, was based on the administration of glycine labelled with radio-phosphorus.

Dr. G. E. Francis and Dr. A. Wormall, of St. Bartholomew's Hospital Medical College, have already published a series of investigations on the interaction of mustard gas and proteins as shown by radio-sulphur (S^{35}). They have now extended the same method to immunological reactions. By injecting hens with radio-phosphorus, they obtained from their eggs a naturally produced but radio-actively labelled antigen, radio-vitellin. They were thus able to determine the amount of antigen in various vitellin–anti-vitellin preparations. Other investigations have been made with artificially phosphorylated proteins labelled with P^{32}, and with an antigen containing radio-sulphur. The latter radio-isotope has also been used by Dr. L. Young and Dr. S. D. Simpson, of Toronto, to show the distribution within the organism of sulphur from British anti-lewisite (BAL).

Prof. V. du Vigneaud, Cornell University Medical College, who earlier in the Congress had described the first isolation of pure synthetic penicillin, has used labelling of a different type. Largely as a by-product of wartime work on the separation, on the basis of mass, of the two principal isotopes of uranium, various normal and stable elements are now available in which partial separation of isotopes of different masses has been effected. Their use in research is dependent on accurate density measurements. With sulphur enriched in S^{34} (normal atomic weight 32.07) and carbon enriched in C^{13} (normal atomic weight 12.00), Prof. du Vigneaud studied hair formation in young de-haired rats. Methionine was synthesized in which the sulphur and two known carbon atoms were thus labelled. He found that 80% of the sulphur in the cystine of the rats' new coat was derived from dietary methionine, but that no significant proportion of the carbon came from the labelled atoms of this element. This suggested the formation of cysthionine as an intermediate.

Blood Factors and Immunology

Dr. W. T. J. Morgan, of the Lister Institute, during a discussion held by the Medical Section on "Macromolecules of Biological Interest," described a technique which he has developed for the separation of the human specific blood factors (A, B, and O) from ovarian cyst fluid. In fluid from ovarian cysts the group substance was often present in considerable amounts and in water-soluble form. It was a mucoid and could usually be isolated by treating the diluted cyst fluid with trichloracetic acid at 0° C. The active material, largely free from contaminating protein, remained in solution and could be recovered by dialysis, concentration, and freeze-drying. After extraction with phenol further purification could be undertaken, and the way was thus opened for the further study of these blood-group-specific mucoids.

During the same discussion Prof. M. Stacey, of the University of Birmingham, referred to the bridge which is being established between immunology on the one hand and chemical research on the large and complex polysaccharides produced by bacteria on the other. The most important work of recent years, he stated, was that of Heidelberger and his associates who, by injection with specific pneumococcal polysaccharides, had successfully immunized human patients against several of the common types of pneumococcal infection (e.g., Types I, II, III, V, VII, and VIII). U.S. Army field trials had shown the great potential value of the method; and Avery, by laboratory methods, had transformed one type of pneumococcal polysaccharide into another. In the *Salmonella* group also it had been shown that such complex polysaccharides were the essential immunizing antigens of the cell. On the more strictly chemical side a number of bacterial polysaccharides had been built up from sucrose and glucose-laevo-phosphate by enzyme reactions carried out in the laboratory. These studies were elucidating the mechanisms by which these "giant molecules" were formed. Finally, the combination of the normal methods of carbohydrate chemistry and chromatographic methods of separation was bringing to light chemical structures which were new to carbohydrate chemistry. Examples were the specific carbohydrates of *M. tuberculosis*.

Antigens and Antibodies

Prof. Linus Pauling, of California, approached the problem of biological specificity from the point of view of the physical "fit" believed to be necessary between the antibody and substances with which it interacted. He claimed that by the substitution of single atoms in a complex synthetic chemical used as an antigen it was possible to estimate numerically the closeness of fit necessary. A bromine atom could be replaced by a metal atom of the same size, and antibodies elicited by the bromine-substituted chemical would still be effective against the metal-substituted material. But if a smaller atom such as magnesium was inserted in the same position there would be less complete precipitation because the "hat," represented by the antibody, was now too big for the magnesium-substituted chemical. Also if the smaller atom was inserted into the antigen the antibodies thus elicited showed no reaction whatever with the substituted chemical containing the larger atom—for the "head" was now too big to fit inside the "hat." From such experiments he estimated that the degree of fit needed for full interaction was of the order of 1½ Angström units. For comparison, the difference in atomic spacing between the actual structure of penicillin and that originally suggested is about 1 Angström unit, the wavelengths of visible radiation being measured in thousands of Angström units. Finally, Prof. Pauling suggested that genes might owe their specific power to the same phenomenon of "complementariness."

Prof. J. D. Bernal, Birkbeck College, reviewed progress in protein chemistry. The similarity of the *x*-ray pattern of all proteins hitherto examined, he stated, indicated a common internal structure down to amino-acid level. Recent work suggested that this was also the case in the giant protein molecules of the plant viruses which Wyckoff had individually photographed by the electron microscope.

Chemotherapy

Work on the chemotherapy of protozoal infections was discussed by the Medical Section alone and also in joint session with the zoologists. Prof. J. A. Shannon, of New York, who was unable to be present, contributed a summary of wartime research on antimalarials in the United States. An illuminating point which he made was that the continued vigour with which the search for further antimalarials of the atebrin class had been prosecuted had been largely conditioned by the fear, fortunately unfulfilled, that prolonged administration of atebrin might lead to unexpected toxic effects which might have necessitated its withdrawal. Dr. F. H. S. Curd and others of the I.C.I. team which discovered paludrine illustrated from this example the extent to which the search for biologically active substances could be shortened, even in the present state of knowledge, by the imaginative employment of pharmacological and chemical arguments.

In the joint session with the zoologists Dr. L. P. Walls, of the Wellcome Chemical Research Laboratory, described the results of tests in Bechuanaland and the Gold Coast against bovine trypanosomiasis with dimidium bromide (" 1533 ") and phenidium chloride (" 897 "). Both are members of a group of substances which were first prepared as antibacterials by Prof. C. H. Browning, of Glasgow. A protracted prophylactic action has been obtained, but care is necessary in treatment to avoid toxic reactions. Mr. H. J. Barber, of the research staff of May and Baker, reviewed amidine chemotherapy, which he pointed out had been somewhat overshadowed by penicillin and the antimalarials. Its field of usefulness was, however, being gradually extended, and current work was establishing the value of 4:4′-diamidinodiphenoxypentane in the prophylaxis of human (African) sleeping sickness.

Dr. W. Bradley, British Drug Houses, discussed the effects of various types of substitution on the muscle-relaxing drugs of the glycerol series, research on which had been stimulated by recent applications in medicine and surgery. In the aryl ester series, maximum activity was reached with the introduction of simple groups, more complex substitution again reducing the activity. The nature of the substituted group, whether alkyl, alkoxyl, or halogen, was less important, although both basic and acidic groups abolished the activity. The results as a whole suggested that both the size and the shape of the molecule affected the muscle-relaxing property.

Nutrition

Discussions on nutrition ranged widely. One on the effects of dietary restriction in man, introduced by Sir Jack Drummond, brought together information from the Far East, France, and Brussels, as well as the results of the Minnesota experiment in rehabilitation. Other contributions described the effect of wartime shortages on livestock.

Dr. D. A. Smith, of the London School of Hygiene Nutrition Unit, quoted the records of the Hong Kong civilian internment camp to show that, even with a severe deficiency of calories, there was a tendency to establish equilibrium at a lower metabolic level. After a year on 1,850 calories a day, weight loss had ceased at about 25% below normal. Numerous subjective phenomena were experienced, and psychological changes were attributed rather to general under-nourishment than to specific vitamin deficiencies. Results during the starvation period of the Minnesota experiment, described by Prof. A. Keys, Director of the University Laboratory of Physiological Hygiene, were in close agreement with the Hong Kong figures, except that balance at the lower level was attained more quickly; 32 young adult males, who had required 3,000 calories for balance during three months of normal feeding, were balanced at about 1,700 calories, at 76% of normal weight, after six months. Three months of restricted refeeding followed, and finally 10 months of unlimited diet. Changes in body water and fat obscured " active tissue " recovery, if evaluated from gross weight alone. In general, functional recovery paralleled the recovery of active tissue, and under the most favourable conditions full rehabilitation required from 6 to 12 months. Supplementary vitamins and proteins were found to be not important. At intakes of less than 3,000 calories recovery was " very slow," and above 4,000 the added weight was mostly fat. Dr. J. Trémolières, of the National Institute of Hygiene, Paris, compared the average deficits in height and weight shown by boys and girls during the period 1944–5 in a number of French cities. Deficits in height were most noticeable in boys, and in weight in girls. They appeared after the age of 9, and increased quickly to a maximum at 14. They were reduced by about 50% between November, 1944, and November, 1945, as the food situation became better. The Belgian experiment was of short duration. It showed that ten days of special feeding was enough to bring about a marked increase in strength of grip in a group of factory workers.

Reports on livestock in wartime came from Sweden and Great Britain. Dr. S. Nordfeldt, of the Royal Agricultural College, Uppsala, stated that the use of a special wood pulp fodder, of which between 2 and 3 kg. could be given daily to cows, had enabled milk deliveries to be maintained without restriction at all times. Dr. S. J. Rowland, of the National Institute for Research in Dairying, Reading, attributed an acute late-winter decrease in solids other than fat from 1941 onwards, and persisting to the present time in the milk from British cattle, to reduced supplies of imported concentrates. This was, however, superimposed on a steady decline in the quality of British milk over the last fifteen to twenty years, both in fat and " solids-not-fat." He thought this was due to excessive concentration on breeding for yield, without reference to composition or to the balance in which different breeds were represented. The quality of Norwegian milk was stated by Dr. G. Aas, of Oslo, to have improved from 1927 to 1940, and then declined to about its former level. Dr. James Stewart, of the Moredun Institute, near Edinburgh, made the point that the known effects of local trace-element deficiencies on livestock provided a strong argument against " non-scientific opinion " which sought to prevent the use of artificial fertilizers on health grounds. Other examples came from plant nutrition.

Prof. A. N. Worden, of Aberystwyth, threw out the further suggestion to the medical profession that the results of studies on lambs and calves, showing the significance of colostrum in relation to antibody production and nutritional status, suggested that " it would be well worth while to re-investigate by modern methods the role of breast milk, including colostrum, in disease resistance in the human child."

In a discussion held by the organic chemists on vitamins, Dr. D. A. van Dorp, of N.V. Organon, Oss, Holland, argued from a comparison of chemical structure and physiological action in different vitamin A derivatives that the functions of visual control, growth, and oxygen transport should be regarded as separate. Dr. L. J. Harris, of the Dunn Nutritional Laboratory, Cambridge, gave a critical survey of methods of vitamin estimation.

MEDICAL ARTISTS

The exhibition of oil paintings and water colours arranged by the Medical Art Society at the house of the Royal Society of Medicine suggests that members of the medical profession who find their recreation in painting like to get as far away as possible from the professional scene in their choice of subjects. Of the 150 frames only one encloses a medical subject—an operation performed in a hospital ship, the work of former Surgeon Lieut.-Commander E. Puddy. Nearly all the rest are landscapes or still life. Portraiture is almost absent, though an exception is " House Physician," a splendid example of the African doctor, by Elliott Blake, who also shows a lurid " Dunkirk." But the quiet English countryside is the recurring theme. Even Sir Philip Manson-Bahr takes us no further towards the Tropics than the woods and fields of Surrey. Sir Harold Gillies finds his inspiration in Norway and Iceland. Dr. John Parkinson favours the Channel harbours. Mr. Norman Patterson concentrates on flowers and glassware. Dr. T. H. Somervell, the climber of Everest, turns to mountain scenery. Here and there is an example of the grotesque, such as the explosion of the atom bomb in the garden of Eden, but most are pleasant straightforward transcriptions which must have given their producers keen pleasure, and some of that pleasure they transmit to others.

NATIONAL (WAR) FORMULARY

The third edition of the *Formulary* will be published shortly. We list below the medicaments that have been added to or deleted from it. In addition a number of minor alterations have been made in the composition of certain mixtures, the naming of drugs, and dosage.

Additions

General Section

Applicatio D.D.T.—

D.D.T. of commerce	17½ gr.
Emulsifying wax	17½ gr.
Solvent naphtha (90/160)	145 min.
Oil of citronella	5 min.
Water to	2 fl. oz.

Auristillae Penicillini.—An aqueous solution containing 0.05% chlorocresol and, unless otherwise directed, 2,500 units of penicillin (calcium salt) per ml.

Capsula Pluravit.—Contains vitamin A, aneurine hydrochloride, riboflavine, ascorbic acid, and vitamin D.

Cremor Penicillini B.P.—Contains, unless otherwise directed, 500 units of penicillin (calcium or sodium salt) per ml.

Cremor Zinci N.W.F.—

Zinc oxide	150 gr.
Wool fat	40 gr.
Oleic acid	5 gr.
Arachis oil	150 gr.
Solution of calcium hydroxide	135 gr.

Cremor Zinci et Ichthammolis N.W.F.—Zinc cream *N.W.F.* containing 5% w./w. of ichthammol.

Elixir Cascarae Sagradae B.P.

Elixir Sennae B.P.C.

Emulsio Paraffini Liquidi et Magnesiae.—Formula as for emulsio paraffini liquidi alkalina *B.P.C.*

Gargarisma Phenolis B.P.C.—Contains 5% glycerin of phenol.

Gargarisma Potassii Chloratis.—

Potassium chlorate	80 gr.
Water to	8 fl. oz.

Guttae Cocainae et Homatropinae.—An aqueous solution of cocaine hydrochloride 2% and homatropine hydrobromide 1% containing 0.05% of chlorocresol.

Guttae Penicillini.—An aqueous solution containing 0.05% chlorocresol and, unless otherwise directed, 2,500 units of penicillin (calcium salt) per ml.

Guttae Sulphacetamidi Fortes.—An aqueous solution containing 30% soluble sulphacetamide and 2% boric acid. For use in the presence of infection.

Guttae Sulphacetamidi Mites.—An aqueous solution containing 10% soluble sulphacetamide and 2% boric acid. For prophylactic use.

Injectio Penicillini N.W.F.—An aqueous solution containing, unless otherwise directed, 50,000 units of penicillin (calcium salt) or penicillin (sodium salt) per ml.

Injectio Penicillini Oleosa N.W.F.—A suspension of penicillin (calcium salt) in a 4.5% solution of beeswax in either arachis oil or ethyl oleate, containing, unless otherwise directed, 125,000 units per ml.

Mistura Gentianae Acida.—

Dilute hydrochloric acid	10 min.
Concentrated compound infusion of gentian	30 min.
Chloroform water to	1/2 fl. oz.

Mistura Gentianae Acida cum Nuce Vomica.—

Tincture of nux vomica	10 min.
Dilute hydrochloric acid	10 min.
Concentrated compound infusion of gentian	30 min.
Chloroform water to	1/2 fl. oz.

Mistura Gentianae Alkalina.—

Sodium bicarbonate	10 gr.
Concentrated compound infusion of gentian	30 min.
Chloroform water to	1/2 fl. oz.

Mistura Gentianae cum Rheo.—

Sodium bicarbonate	10 gr.
Concentrated infusion of rhubarb *B.P.C.*	15 min.
Concentrated compound infusion of gentian	15 min.
Peppermint water to	1/2 fl. oz.

Naristillae Penicillini.—An aqueous solution containing 0.05% chlorocresol and, unless otherwise directed, 2,500 units of penicillin (calcium salt) per ml.

Nebula Adrenalinae et Atropinae Composita.—

Atropine methylnitrate *B.P.C.*	1/2 gr.
Papaverine hydrochloride *B.P.C.*	3½ gr.
Adrenaline	2 gr.
Chlorbutol	2 gr.
Dilute hydrochloric acid	5 min.
Sodium metabisulphite	1/2 gr.
Distilled water, recently boiled and cooled to	1 fl. oz.

Nebula Penicillini.—An aqueous solution containing 0.05% chlorocresol and, unless otherwise directed, 50,000 units of penicillin (calcium salt) per ml.

Oculentum Penicillini B.P.

Pilula Violae Crystallinae.—Enteric-coated pills containing 1/6 gr., 1/4 gr., 1/2 gr., or 1 gr. of crystal violet.

Pulvis Penicillini et Sulphathiazoli.—A sterile powder containing, unless otherwise directed, 5,000 units of penicillin (calcium salt) per g.

Solvella Penicillini N.W.F.—Contains either 10,000 units or 12,500 units of penicillin (calcium salt).

Suppositorium Bismuthi Subgallatis B.P.C.—Contains 5 gr. of bismuth subgallate.

Tabella Acidi Acetylsalicylici Composita B.P.C.

Tabella Butobarbitoni (0.1 g.).

Tabella Dienoestrolis (0.1, 0.3, 1, and 5 mg.).

Tabella Ferri Phosphatis cum Quinina et Strychnina B.P.C. *(equivalent to 30 and 60 min. of syrup).*

Tabella Ferri Sulphatis Composita.—Sugar-coated tablets, each containing:

Exsiccated ferrous sulphate	3 gr.
Manganese sulphate	1/25 gr.
Copper sulphate	1/25 gr.

Tabella Hexoestrolis B.P.C. *(0.5, 1, and 5 mg.).*

Tabella Nicotinamidi B.P. *(50 mg.).*

Tabella Paludrinae (0.1 g.).

Tabella Phenacetini et Caffeinae B.P.C.

Tabella Pheniodoli (0.5 g.).

Tabella Stilboestrolis B.P. *(0.5 and 1 mg.).*

Tabella Succinylsulphathiazoli (0.5 g.).

Tabella Sulphadiazinae B.P.

Tabella Sulphadimethylpyrimidinae (0.5 g.).

Tabella Sulphaguanidinae B.P.

Trochisci Penicillini B.P.

Unguentum Calaminae B.P.C. (*Unguentum Calaminae* N.W.F., 1943, *has been renamed Unguentum Calaminae Aquosum* B.P.C.).—Contains 16.7% of calamine in a base of yellow soft paraffin.

Unguentum Penicillini B.P.

Infants' Section

Cremor Zinci et Olei Ricini N.W.F.—

White beeswax	50 gr.
Wool fat	50 gr.
Liquid paraffin	104 gr.
Zinc oxide	36 gr.
Castor oil	240 gr.

Mistura Gentianae Acida pro Infantibus
Mistura Gentianae Alkalina pro Infantibus
Mistura Gentianae cum Rheo pro Infantibus
} Compound concentrated infusion of gentian has replaced infusion of quassia in the corresponding mixtures of the *N.W.F.*, 1943.

Mistura Potassii Bromidi pro Infantibus.—

Potassium bromide	4 gr.
Syrup	15 min.
Chloroform water to	60 min.

Pulvis Aluminis et Zinci N.W.F.—A sterile powder containing potash alum 20%, purified talc 40%, and zinc oxide 40%. Sufficient powder for one application to be packed in stout paper or "cellophane" envelopes, as for pulvis sulphanilamidi.

Deletions

General Section

Emuls. Anis. et Menth. Pip.
Emuls. Ol. Vitamin. B.P.
Glycer. Proflavin.
Gutt. Cocain. Oleos.
Lot. Trinitrophenol. B.P.C.
Mist. Arsen.
Mist. Calc. Lact.
Mist. Ergot.
Mist. Ferri Arsen.
Mist. Ferri Perchlor.
Mist. Ferri Salicyl.
Mist. Hydrarg. Perchlor.
Mist. Quass. c. Rheo.
Pulv. Iodophthal. Co.
Ung. Hydrarg. Ammon. Aquos. B.P.

Infants' Section

Crem. Zinc. (replaced by cremor zinci et olei ricini).
Emuls. Ol. Vitamin. B.P.
Ext. Malt. c. Ol. Vitamin. B.P.
Mist. Quass. Acid. pro Infant.
" " *Alk.* " "
" " *c. Rheo* " "
} Replaced by corresponding mixtures containing gentian.
Pulv. Santonin. Co.
Tab. Santonin. Co.

Correspondence

Poliomyelitis

SIR,—In your leading article on poliomyelitis (July 26, p. 135) you do not mention swimming and diving in sewage-polluted rivers as a cause of infection. When will the people of this country understand that if they will turn sewage into our rivers and then bathe in them they must expect trouble. Again and again we see cases of infantile paralysis appearing in farms and villages on the banks of polluted rivers. The virus is present in faeces and then passes through sewage into rivers. Young people bathe in sewage-polluted rivers, and we wonder why they get infantile paralysis.—I am, etc.,

New Barnet, Herts. J. E. ELAM.

SIR,—I would like to draw public attention to the danger of labelling bins "Pig Food." Take off the lid the day before the refuse is collected and you find bones, meat, fat, paper, rotten cabbage mixed up with bits of carpet, sardine tins, newspaper, and a living mass (often several inches deep) of maggots, the last item keeping us well supplied with flies. I suggest that the spread of infantile paralysis may be thus caused, an outbreak of the disease in a hill station in India being coincident with stable manure being thrown on the open ground instead of being conveyed to the destructor.—I am, etc.,

London. K. O. VAUGHAN.

SIR,—The official memorandum dealing with precautions against acute poliomyelitis (*Journal*, July 26, p. 141) is not very helpful and in places a little ludicrous. For instance, in a disease which is as likely as not air-borne and principally attacks children under five, we read that gargles and nasal sprays have been disappointing.

Would not it have been better to say that the nostrils of the immature should be periodically swabbed out, and that the same can be effectively done by the adult, when washing the face, with the wet fingers, thus avoiding the paraphernalia of a nasal douche, which will certainly not be persisted in more than a few times?—I am, etc.,

London, S.W.5. PERCY TATCHELL.

Oxygen Poisoning in Man

SIR,—May I venture to doubt Sir Leonard Hill's theory (June 21, p. 900) that oxygen convulsions and nitrogen and argon narcosis are both due to carbon dioxide accumulation? Subjectively and objectively the symptoms of the two conditions are utterly different. I have never experienced or observed confusion or euphoria before an oxygen convulsion. Confusion is universal and euphoria common in nitrogen narcosis. Carbon dioxide enhances both oxygen and nitrogen poisoning. The obvious explanation of this fact is that it causes cerebral vasodilatation, and thus facilitates the absorption of other gases by the brain. I hope shortly to publish data which may help to clear this question up.

With regard to the questions of priority raised in his letter, the Official Secrets Act makes a full discussion illegal. No one can doubt the fundamental part played by Sir Robert Davis, but so long as publication is restricted it is impossible to assign credit objectively, and controversy can lead nowhere.—I am, etc.,

University College, London, W.C.1. J. B. S. HALDANE.

Tuberculosis in a D.P. Camp in Austria

SIR,—With reference to Dr. F. J. W. Miller's paper on tuberculosis among small children in Newcastle (July 19, p. 91), I wonder if some observations on children in an Unrra-operated D.P. camp in Austria would be of interest. This camp had a shifting mixed Polish and Ukrainian population varying from 1,600 to 2,100. The consequent frequent changes of barracks made tracing of contacts extremely difficult. Indeed, usually no contact with known adult cases could be discovered. No ill child (with the exception of one, whose father's illness was discovered only through the child) had an infected parent, and none of our infected parents had sick children, but two open cases had positively reacting children with very old calcifications.

I spent one year in this camp. During this time 9 open and 7 closed adult cases were removed to a sanatorium after great moral struggles or left the camp, and 3 closed cases remained in the camp. Shortly after my arrival a number of children over 5 years old were sent to a sanatorium in Italy and did not return, and 5 infected children in a family of 6 remained. These are not included in the following remarks. In this year 10 children under 3 and 3 under 5 years were found to have active primary tuberculosis (I exclude figures for older children), 3 as a result of Evans patch-testing, which was carried out last December in all camps as a preliminary to mass radiography, unfortunately delayed by various difficulties until June. 240 children under 10 were examined, and suspicious cases further examined by the Pirquet test. 46 were positive and were *x*-rayed immediately and, if not active, again in three months. One child aged 18 months was negative in December but in April was found to have a large infiltration and to react positively. Of the 46, 2 or 3 showed nothing abnormal, 22 showed active or subsiding disease, and the rest one or more calcifications. About 12% of adults were *x*-rayed at some time, and about 50% of these showed calcifications of unknown aetiology.

The 13 young children mostly appeared very ill at first, with pallor, sweating, loss of weight, and cough. About half had marked physical signs in the lungs. After a few months all except the baby referred to above, who unfortunately developed whooping-cough, were steadily improving in every way. None of these children had any special treatment other than extra milk and butter, as the mothers were very reluctant to allow them to go into hospital and did not enforce rest or early bed or distasteful medicines—or indeed anything the children didn't want. The camp was appallingly crowded, the rooms usually stuffy and either too hot or too cold, but at least we usually managed to give every tuberculous family a room to themselves. Iron and vitamin preparations were taken rather irregularly owing to the mothers' standard of education and difficulty at first in getting iron. Cod-liver oil was not available.

Regular supervision and examination was also very difficult to enforce and indeed only brought about by withholding milk until the mother brought the child, when one would remark to the mother, "You evidently consider baby quite healthy, so why should he have extra milk?"

I was surprised at the good results in spite of this laissez-faire attitude. In fact, tuberculosis at all ages was taken rather lightly. The elder patients demanded dog fat to eat and rub on their chests as a sovereign remedy (there was a high mortality among dogs at one time, I believe), and sanatorium treatment was regarded always with great disfavour owing to the separation from family and the discipline required. So long as they got some extra food they didn't see why they should bother or be bothered.

I would be very interested to see pre-war tuberculosis death figures for Poland, as such relatively rapid recovery among children so ill appears unusual to me. Was their degree of illness due entirely to their previous poor nourishment, and their recovery when nutrition was improved a sign of their natural high immunity? All our new cases with the exception of the baby were discovered in the second half of 1946, when food for the whole camp was poor, while from November, 1946, the children's diet was supplemented by International Red Cross parcels.

Similar conditions were found in other camps. Full reports will no doubt be published by the Unrra tuberculosis specialist.—I am, etc.,

Northwood, Middlesex. AGNES C. CLARK, Late Medical Officer, U.N.R.R.A.

Meningitis after Spinal Anaesthesia

SIR,—Dr. C. A. Vuylsteke (*B.M.J.*, Feb. 1, p. 179) reported four cases of pseudomonas meningitis following spinal anaesthesia. Three of these, caused by the melanogenes variety of *Ps. pyocyanea*, were fatal; one, caused by true *Ps. pyocyanea*, recovered after sulphathiazole treatment. Patients had been operated upon by three different surgeons at two surgical clinics whose nursing personnel belonged to the same school. During this period they had five other cases of meningitis. Careful examination of the cerebrospinal fluid did not reveal the slightest trace of any pathogenic agent. Four patients were cured, one died. Every experienced surgeon will agree that the occurrence of pyocyanea infections in surgical wards means very defective aseptic technique. The author holds the lack of sterilization of the brushes used by the surgeons to scrub their hands responsible

for the meningeal contamination. Since then the brushes have always been sterilized and no further cases of meningitis have been reported.

True infection of the cerebrospinal fluid following spinal anaesthesia may very rarely be attributed to pyohaemia or to ulcerations of the skin; the contamination through anaesthetic solution ampoules also seemed to be very rare, since the phials are not immersed in spirit but dry-stocked and cautiously opened. In my opinion the causes of the cerebrospinal fluid infection in the recorded cases are quite evident. I believe that the sources of contamination are the hands of the surgeons and the instruments.

Prevention means clean hands or gloves and sterilized instruments. Bacteriological sterility of infected syringes and needles can only be secured through two techniques: either warm-air oven (Poupinel) one hour at 150° C. (302° F.), or steam ten minutes at 120° C. (248° F.). Syringes of Record type do not resist these sterilization techniques, and all-glass syringes ("pyrex") are especially useful. We used spinal anaesthesia for 35 years in more than 50,000 cases, and so far no fatal meningitis has been observed in our services. In conclusion, meningitis following spinal anaesthesia can be easily avoided by aseptic measures. Boiling of infected syringes is not sufficient to warrant sterility. Syringes of Record type may be the cause of the C.S.F. contamination.—I am, etc.,

J. SEBRECHTS,
Professor of Surgery.

Bruges.

Arsenical Dermatitis Treated with BAL

SIR,—I was surprised to read the article by Dr. J. Lawrence Reeve (July 26, p. 132) on the successful treatment of two cases of arsenical dermatitis with BAL. To the best of my knowledge this drug is still on the secret list. More surprising, however, than this premature disclosure is the author's conclusion. After describing the progress of two cases, Dr. Reeve concludes that "BAL may well be the answer to the syphilologist's prayer, for, instead of cases of arsenical dermatitis being in hospital for weeks at a time, they may now be treated as out-patients."

I venture to predict that those venereologists who, through the co-operation of the Medical Research Council, have been able to obtain small supplies of this drug over the past two years or more, and whose experience in its use for cases of arsenical dermatitis extends to many more than two cases, will not subscribe to the author's view as expressed in his conclusion. On the contrary, I feel sure they will continue to regard arsenical dermatitis as a very serious complication to treatment and will, in all but the mildest cases, endeavour to admit their patients to hospital. At the same time they will give thanks to the discoverers of BAL for having provided them at last with a drug whose efficacy cannot be doubted in the treatment of this serious condition and which needs no extravagant or premature claims for its recommendation.—I am, etc.,

A. E. TINKLER.

Truro, Cornwall.

Primary Treatment of Fingertip Injuries by Skin Grafting

SIR,—I have read with great interest Dr. S. J. Krister's note (July 26, p. 152) on this subject. It is most regrettable that though this method is now part of standard theoretical teaching and is mentioned in most textbooks it is still not used often enough, with consequent daily loss of useful finger-lengths. For the past three years I have routinely used primary plastic procedures in all recent injuries involving loss of skin including well over a hundred fingertips. May I therefore be permitted to make a few comments on Mr. Krister's admirable description?

In industrial accidents—the most common source of finger injuries—clean-edged wounds as are usually caused by slicing machines are relatively uncommon. Crushing with or without avulsion or blunt tearing are the types of trauma most frequently encountered. These make special preparation of a graft bed necessary, but grafting is called for just as much as in the simpler and therefore easier injuries.

Though apparently aware of its importance Mr. Krister has not stressed sufficiently the necessity of excising all devitalized or grossly contaminated tissue. Failure to do so will lead inevitably to sepsis and constitutes the most common source of graft failure. Satisfactory excision of an irregular wound is best carried out in a bloodless field, and for this purpose I found most efficient a rubber band tourniquet applied near the base of the finger after a ring block. The tourniquet also guarantees absolute haemostasis until the application of the compression dressing, thus avoiding the graft's being lifted up by a small collection of blood or the necessity of applying a ligature beneath the graft—two other causes of failure.

I have found full-thickness grafts quite satisfactory but prefer thick pinch grafts—i.e., those including the full thickness of the dermis in their centre. Using these, perforating the graft is unnecessary, but when the diameter of the defect exceeds 1/2 in. (1.25 cm.) I use two or three grafts applied side by side. With this modification suturing of the graft is usually unnecessary provided a compression dressing is used. As the grafts are hardier the percentage of success is nearer 100% than 80%, and the final appearance is equally good.

Except in the presence of a fracture of the remaining bone 14 days is too long a period to keep on the primary dressing. Owing to the necessary thickness of the latter the graft becomes softened and soggy. Change of the dressing is therefore indicated on the eighth or ninth day, even sooner in children. At this time the graft will be found to have already firmly taken and usually requires protective covering for only one further week, thus cutting down the patient's period of incapacity.—I am, etc.,

P. P. H. SCHMIDT.

London, W.1

Surgical Aspects of Amoebiasis

SIR,—It is unfortunate that Mr. P. Theron's article (July 26, p. 123) on the "Surgical Aspects of Amoebiasis" gives further publicity to the technique of air replacement of liver abscess. This practice, although productive of interesting *x*-ray pictures, cannot be of benefit to the patient, and the presence of air in the cavity may delay healing. Should repeated aspiration be considered necessary the clinical state of the patient is a reliable guide to its frequency.

If penicillin and sulphadiazine are administered to patients who fail to respond to emetine alone, aspiration, with its attendant hazards, can usually be avoided. Even when the inflammatory process has reached the thoracic or abdominal wall the response to this combined therapy is frequently satisfactory, and with earlier diagnosis aspiration and drainage should rarely prove necessary.—I am, etc.,

R. N. TATTERSALL.

Leeds.

Calculation of the Colour Index

SIR,—Dr. Arthur Jordan and Dr. Herbert Levy (July 26, p. 149) would have been wise to have studied my letter more carefully before proceeding to criticize the contents. My intention was to protest against the rather ignorant viewpoint, unfortunately so prevalent at the moment, that the colour index has had its day and should be replaced by the blunderbuss use of the haematocrit—a procedure which to most people with any experience of large-scale haematology is obviously impracticable even if it were desirable. The haematocrit has its uses, but it should be reserved for cases where a primary screening by experts carrying out routine blood counts, together with a consideration of clinical findings, has shown it to be indicated. Furthermore, I was fully aware of the various investigations of human error in calculating haemoglobin, and the figures quoted by Dr. Jordan merely confirm that 80% of trained observers are likely to produce normal values of colour index within the range of 0.90 to 1.05. The personal errors of the remaining 20% would be uncovered by the ancillary investigations which were maintained. The errors of the cell count are not relevant to this discussion as they affect the mean cell volume and colour index equally. A further point is that the haematocrit is subject to mixing errors and variations of centrifuge speed—a serious disability in these days of current cuts.

I would point out to Dr. Levy that a mean cell volume determination is not likely to give much more help in the diagnosis of pernicious anaemia than an accurately calculated colour index. In any case no pathologist of repute would be prepared to concur in a diagnosis of this disease without first examining the bone marrow and gastric contents. Inaccurate diagnosis of pernicious anaemia is unfortunately not uncommon and was referred to in a previous communication (Nov. 24,

1945, p. 741). The only remedy lies in the adoption of the procedures described in my previous letters. The value of the colour index in evaluating response to treatment lies in microcytic rather than macrocytic anaemias. It is a pity that Dr. Levy has attempted to introduce a pathologists-versus-clinicians atmosphere into the discussion; any interest shown by clinicians in these matters is welcome. There would also seem to be no justification for Dr. Jordan's introduction of the name of the late Sir Frederick Gowland Hopkins.—I am, etc.,

Liverpool. W. K. TAYLOR.

***This correspondence is now closed.—ED., *B.M.J.*

Spinal Pumping

SIR,—Following the annotation on "Spinal Pumping" (July 12, p. 62), Mr. J. S. Horn has pointed out (July 26, p. 147) how important it is "for Speransky's basic experiments to be checked on the widest possible scale so that his conclusions may either be rejected or further developed." With this statement we heartily agree. During the last year we have reinvestigated in our department one of the early fields covered by Speransky and his collaborators, namely, the connexions between the spinal subarachnoid space and the lymphatic system. We have been able to substantiate the main findings of the Russian school to the effect that widespread connexions do exist between this space and the paravertebral lymph nodes, particularly those in the aortico-lumbar and sacral regions; and this has been done with a technique which, we believe, departs even less from physiological conditions than does that employed by Speransky.

Our results were presented in a paper read before the Edinburgh meeting of the Anatomical Society of Great Britain and Ireland in June, and will be published *in extenso* elsewhere. Encouraged by these findings we have entered upon a reinvestigation of other basic problems raised by Speransky's provocative work.—We are, etc.,

Department of Anatomy, University of Bristol. E. J. FIELD. J. B. BRIERLEY.

Causalgia of the Face

SIR,—I feel I must disagree with Mr. C. H. Cullen's comments (July 5, p. 32) on my paper on "Causalgia of the Face." I should have replied to his letter sooner if it were not that owing to absence from home for a few weeks I have only just seen the number of the *Journal* in which it appeared.

Mr. Cullen states that "novocain" block of efferent sympathetic fibres below the superior cervical sympathetic ganglion would produce a temporary paralysis of these fibres in their peripheral course and so prevent their being stimulated by pressure on the superior cervical ganglion. But it is known that efferent fibres peripheral to a block remain capable of conducting impulses when directly stimulated. Even when the block is not merely a temporary one but a complete anatomical section, they remain capable of conducting impulses until such time as the fibres, cut off from their cells of origin, undergo some degree of degeneration. Lovatt Evans, in *Principles of Human Physiology*, and Samson Wright, in *Applied Physiology*, agree that nerve fibres distal to a point of section can conduct impulses for a period of three days following section; and in any case it is probable that many sympathetic fibres to the face have their cell station in the superior cervical sympathetic ganglion and so would not degenerate after section of the sympathetic chain below the ganglion. It can be seen, then, that a central "novocain" block could not have prevented sympathetic impulses being transmitted to the periphery when the ganglion was stimulated and could not have prevented facial pain being felt if this pain was in fact produced by efferent sympathetic impulses and if pain impulses were then conveyed centrally by some other pathway.

I might perhaps mention here that a number of other observations, which it is hoped will be published shortly, that I made when investigating this subject from an entirely different direction point to the same conclusion.—I am, etc.,

Belfast. J. A. W. BINGHAM.

The B.M.A. and World Organizations

SIR,—It is with misgivings that one reads the approbation with which Sir Hugh Lett (July 26, p. 121) couples the name of the B.M.A. with those of the World Health Organization, the World Medical Association, and Unesco. Are his remarks endorsed by the B.M.A. executive?

A "world" organization necessarily premises a central authority, in other words, a monopoly of administrative power; and the advocates of "world" organization are always discreetly silent upon the two crucial points of this matter—i.e., (1) how can a central monopoly of administrative power be anything other than a dictatorship, and (2) who is it proposed shall do the dictating?

Does not the B.M.A. pride itself upon being a democratic institution, and, if so, how does it propose to remain so while subordinating its authority to a dictatorship?—I am, etc.,

St. Germans, Cornwall. W. H. SPOOR.

Delay to Army Overseas

SIR,—From time to time the War Office issue addenda advertising civilian medical appointments. The closing date for applications for the majority of these appointments is past by the time these addenda reach medical officers in the Middle East. For example:

Addendum No.	Date of Issue from War Office	Closing Date for Application	Date of Receipt at District H.Q.
5	Not known	Not stated	May 5
6	Feb. 18, 1947	Appt. No. (i) June 30 " " (ii) May 1 " " (iii) March 8	May 5
7	Feb. 25, 1947	March 31	May 5
9	March 25, 1947	Appt. No. (i) April 12 " " (ii) May 24 " " (iii) March 29 " " (iv) March 29	May 17
11	April 17, 1947	May 19	May 14
13	May 6, 1947	June 11	June 26
14	May 13, 1947	Appt. No. (i) Nov. 30 " " (ii) June 7	July 3
15	May 27, 1947	Not stated	June 21

I know that representations have been made through normal Army channels with no satisfactory result. The delay in transmission does not appear to be within the Middle East theatre. As this matter operates unfavourably towards medical officers stationed in the Middle East I ask you to publish this in the hope that the War Office may regain some interest in the doctor in uniform.—I am, etc.,

TONO-BUNGAY.

Standard of Nursing Education in the U.K.

SIR,—With reference to the Registrar of the General Nursing Council's letter (July 26, p. 149), self-disparagement is one of the British traditions and privileges, but one hopes that the General Nursing Council will not indulge excessively on this occasion. It is possible that the number of lectures given to nurses in this country is less than the number given to nurses in Canada. I do not know, neither do I know the type of lecture given in Canada. I can only say that during the war I met and served with British nurses, both of the Army and R.A.F., was nursed by nurses of the Royal Navy and in the E.M.S., and worked also with Canadian nurses and American nurses. My experience did not lead me to believe that the finished product of Britain in the form of a nurse was other than of at least equal standard to the finished product of a nurse from any other country. I will admit that Canadian and American nurses, and in particular the latter, knew a great deal about medicine, and particularly about medical psychology, but I did not think that their knowledge of nursing the sick was any better than that of our nurses.

One knows perfectly well that a medical student when he qualifies has a lot of technical book knowledge but no practical experience. It may be that a similar situation exists in regard to nursing in Canada, but the important thing for nurses is that they should have not so much a theoretical knowledge as a practical knowledge of how to nurse a patient in bed,

and it is most important that their training should be as much in the practice of nursing as in the theory of nursing. Recently correspondents have urged that less time should be given to theory in the syllabus of the General Nursing Council and more to the practical side of nursing, and it is the finished product that matters and not the standard of theoretical training.—I am, etc.,

The London and Counties Medical Protection Society, London, W.C.2. RICHARD W. DURAND.

State Medical Service in New Zealand

SIR,—Sir Ernest Graham-Little's report (May 3, p. 611) on Mr. A. E. Porritt's letter reminds me of the good old days in India. Distinguished visitors came out in the cold weather and returned before the advent of the monsoon with a dispassionate review of the Indian administration, and usually with a complete solution of the Indian problem. I was in the Health Department before, during, and after the inception of the scheme, but merely as an interested observer. Since my release from the N.Z. Medical Corps I have worked in it as a general practitioner.

The scheme has one serious defect. The medical gentleman who was present at the birth of the Bill was not a specialist. He did not make any provision for specialists. The ablest of our profession are devoid of any share in the medical benefits, and the public are deprived of their services. Mr. Porritt is looking at the scheme through specialist spectacles.

The scheme was launched when most of the young and active practitioners were out of the country with the Armed Forces. A number of others were employed in military duties in New Zealand. There was a serious shortage to deal with the increase of work natural to the new scheme. Some of the practitioners have returned, some are with Unrra, and there are an abnormal number in the United Kingdom on post-graduate courses. When things return to normal most of the defects complained of will disappear.

(*a*) I agree with Mr. Porritt that the public have an improved service. They seek advice early. There is no economic advantage in going first to the chemists, the herbalist, or the chiropractor.

(*b*) In most places arrangements have been made for a practitioner service for urgent cases any time during the day or night and over the week-end. The Order of St. John have been most helpful in this direction.

(*c*) The fact that the scheme is a fee-for-service one (Heaven protect me from a salaried service!) and that the patient has choice of doctor tends to keep the standard of medical practice high. The indifferent doctor will soon be drawing unemployment benefit. There are no inducements for a doctor to attempt work he cannot do, and every inducement to send difficult cases to a consultant or to hospital. Many hospitals are open to practitioners wishing to take up special work, and the B.M.A. have organized three-monthly refresher courses. It takes anything up to six weeks to arrange appointments with a consultant. They cannot be doing so badly.

(*d*) If you exclude those immigrants that have not got as far as ethics in their study of English, you will find the standard of ethics in New Zealand as high as ever.

(*e*) A number of newly qualified medical men are attracted by the financial lure of private practice. There remain, however, the desirable type who are prepared to sacrifice the present for the nobler future.

(*f*) New Zealand, if not the best-governed Dominion, is the most governed.

When we regard other walks of life, we enjoy comparative freedom.—I am, etc.,

Whangarei, New Zealand. F. W. W. DAWSON.

SIR,—Dr. A. D. G. Blanc (July 26, p. 146) ascribes adverse criticisms of the New Zealand medical services (which started nearly 10 years ago) to "stalwarts of organized medicine in America and Great Britain." He would seem to have missed my letter (June 14, p. 865) in which I referred in some detail to criticisms made by Mr. Douglas Robb, a member of the New Zealand Medical Council and a distinguished consulting surgeon. Dr. Blanc ignores the fact that both Mr. Porritt and Mr. Robb, the critics cited by me, are themselves New Zealanders. Mr. Robb's exposition, which was much the more detailed and factual, took the form of a small book which was too long for me to summarize in my short letter, but which was ably analysed in the leading article in the *Lancet* of July 5, and reviewed in the *Journal* of July 12 (p. 57).

Mr. Robb insisted strongly on the extravagant expense of the service, the cost of which, out of all proportion to its benefits, must surely be met by the individual citizen in the form of rates and taxes, and Dr. Blanc's description of the service as "free" requires the same modification that must be made of the similar claim for the proposed Service in this country. Mr. Robb describes in detail the present health chaos in New Zealand and lists no fewer than five competing schemes which the service has now developed; Dr. Blanc mentions only one. Mr. Robb makes the significant observation that the cost of the pharmaceutical benefits exceeds the cost of all the other benefits put together, a state of affairs which would seem to suggest that the "bottle of medicine" fetish is rampant in New Zealand and has not been diminished by "universally" provided medical attendance.

A layman's description of the position in New Zealand resulting from the general imposition of the five-day forty-hour week gives a similar picture of general dislocation and discomfort caused by the practical cessation of all activities, as well as of medical, after business hours. I enclose a reprint of this article.—I am, etc.,

House of Commons. E. GRAHAM-LITTLE.

History of Arab Medicine

SIR,—In the *Journal* of Feb. 1 (p. 202) Mr. I. B. George assured your readers that a "statement" by the late Dr. A. R. Neligan was "as misleading as it is incorrect, and reveals little familiarity with the history of medicine. . . ." He also assured them that, in the 14th century, the Church regarded belief in infection as heretical. I pointed out (March 8, p. 314) that the "statement" which displeased Mr. George was a brief summary of a passage in Prof. E. G. Browne's *Arabian Medicine* and noted that the Pope's own surgeon stated explicitly that the plague of 1348–9 was contagious, while, long before, a bishop of the Catholic Church had written on contagion. The tentative diagnosis I made was that Mr. George knew a good deal less than Dr. Neligan about the history of medicine. This diagnosis Mr. George has kindly confirmed (July 26, p. 151).

It is true that his first sentence suggests a graver fault than ignorance (if he *really* knew when he wrote that Dr. Neligan was quoting from a famous Oriental scholar, it would have been disingenuous to abuse Dr. Neligan), but I think this may be due to the syntactical difficulties of English and that the disease is simple ignorance, which a closer study of Prof. Browne's lectures should cure. Mr. George has not, I think, grasped the reason why Prof. Browne advocated further study of the writings in Arabic. It was not a hope of discovering some buried treasure of marketable value, "seeing that the whole system is based on a rudimentary Anatomy, an obsolete Physiology, and a fantastic Pathology"—a remark equally applicable to Galen's writings—but something intellectually nobler: in fact a desire to trace the spiritual kinship of men of all nations and ages of the world who faced honestly the problems of medicine. Take as an illustration the doctrine of temperaments or complexions. To us the old physiology and pathology, the elementary qualities, the hot and the cold, the moist and the dry, are just nonsense in the literal sense of the word; but Galen and Avicenna were dealing with a real problem. To modern psychologists and physicians the classification and diagnosis of human types is as important as it was to our predecessors.

Did Avicenna come nearer to the truth, or what we hold to be the truth, than Galen? Does the Arabian literature preserve elements of further-eastern thought? These are some of the questions Prof. Browne thought worth answering. For such research, he tells us, a scholarly knowledge of Greek, Latin, Syriac, Arabic, and Persian, abundant leisure, voracious and omnivorous reading are essential. Perhaps, one of these days, Mr. George may qualify himself to undertake it.—I am, etc.,

London. MAJOR GREENWOOD.

SIR,—All matters connected with Miguel Serveto are subject to error—perhaps because of the violent religious controversies in which he was involved; so that your correspondent Mr. I. B. George (July 26, p. 151) can be excused if he writes that Servetus was burned at the stake for propounding the pulmonal circulation. Serveto was condemned in Geneva on Oct. 26, 1553, to be "brulez tout vifz" because of his Arianism, though no law existed in Geneva penalizing heresy with death. The passage in his book, *Christianismi Restitutio* (1553), alluding to the pulmonal circulation was first noticed by the surgeon Charles Bernard (1650–1711) and then published in 1694 by William Wootton (1666–1726).

Serveto's execution is a blot on the name of his principal accuser, John Calvin (1509–64). Three copies of *Christianismi* escaped judicial fire—one each in Paris, Vienna, and Edinburgh. The latter, probably, is the torn copy Calvin employed to denounce Serveto to the Roman Catholic Inquisitor through Arneys in Lyons.—I am, etc.,

Little Shelford, Cambridgeshire. H. P. BAYON.

SIR,—I was amazed at the contents of a letter in the *Journal* of July 26 (p. 151) signed I. B. George. I shall not trespass on your space to prove how inconsequential are his allusions concerning the attitude of the "Church" towards anatomy, surgery, and anaesthetics. The idea that hospitalization and hygiene were initiated in Europe through Arab influence is of course perfectly absurd. The implication that Servetus was burned by the "Church" for heresy demands, however, unqualified contradiction. We do not know when he discovered the circulation in the lungs, which he described so clearly in the volume on the renewal of Christianity, for which he was burned at Geneva by Calvin.—I am, etc.,

Farnham Common, Bucks. T. GERALD GARRY.

Rotunda Bicentenary Medical Exhibition

SIR,—We read with astonishment in the *Journal* of July 19 what purports to be a report of the medical exhibition held in conjunction with the International Obstetrical and Gynaecological Congress of the Rotunda Hospital at the Mansion House, Dublin, during the week July 7–12.

The Executive Committee of the Irish Medical Exhibitors Association—a voluntary organization of medical representatives formed for the purpose of holding medical exhibitions without profit or reward—has had an emergency meeting in connexion with your report, and while it welcomes fair and constructive criticism it strongly protests against the facetious manner in which your correspondent has described the exhibition. Already dozens of letters have reached our association from doctors and exhibitors expressing indignation. We feel that you should take immediate steps to rectify this display of bad taste, and give this letter the same publicity as you have given the misstatements of facts. We invite your editorial comment.

The Exhibition consisted of 44 ethical exhibitors from the Commonwealth, U.S.A., and the Continent—each approved by the Medical Committee of the Congress. They with many of the doctors who visited our Exhibition are very surprised at the manner in which the Exhibition was reported in your *Journal*.—I am, etc.,

W. JONES,
Hon. Secretary,
Dublin. Irish Medical Exhibitors Association.

SIR,—Referring to your report of the Irish Medical Exhibition in the *Journal* of July 19 (p. 106). As one of the least of the 150 members of 44 manufacturing firms I should like to record my personal protest at the derogatory reference to "bright young spellbinders." This may have been intended as a facetious remark, but it is unkind, untrue, and uncalled for. Bright possibly, young most certainly not. The great majority of the gentlemen in attendance were well over the fifty-year mark. Every one was a specialist in his own branch of work.

It would be invidious to mention names, much as I should like to do so, but it is worth noting that among these men were many who held very high qualifications in medicine, physics, and chemistry, and who were highly skilled technicians. In some cases these men have carried out most valuable work in research in biochemistry and other fields of science. To mention only a few, there were present those who had done great work before and during the war on penicillin, sulpha drugs, paludrine, anaesthetics and anaesthesia apparatus, and *x*-ray equipment and technique. Among them were the principals of important firms who had flown over to put themselves at the service of the medical profession. It might amaze your correspondent, who so lightly dubbed these people bright young spellbinders, to know the great work they have done and the repute in which they are held. That is why it was untrue.

It was unkind because in every case these men had attended at very great expense and at great inconvenience and interference with their work so as to give freely and cheerfully their experience and knowledge to the members of the medical profession who might desire to avail themselves of it. If it were not that the "tools for the job" had been produced by these men, and men such as they, the success of medical treatment would not be of the high order which it has attained to-day. But the words "despite their accents" gives the clue to the reason underlying the offensive remark. Forty-three out of the 44 firms exhibiting were English, or at least British, firms, and the forty-fourth was exhibiting British and Continental manufactures. Very evidently this was enough for your correspondent to wish to belittle the whole affair and the men who had dared to invade Eire. Surely in these enlightened days science should be international and should know no boundaries, and such childish and bigoted nationalism should be abandoned and credit given to men of good will who give themselves freely to the service of others.—I am, etc.,

D. T. DICKINSON,
Chester. The London Hospital Ligature Department.

*** We regret that in the brief account of the Rotunda Bicentenary Meeting (*B.M.J.*, July 19, p. 106) some observations made by our correspondent have been taken amiss by those responsible for the medical exhibition, and that exhibitors should interpret his colourful comment on their enthusiasm as being derogatory.—ED., *B.M.J.*

POINTS FROM LETTERS

Tobacco

Dr. LENNOX JOHNSTON (Wallasey) writes: For 20 years Dr. A. G. Pannet has smoked, he alleges (June 28, p. 950), "purely for enjoyment," and I do not doubt that he speaks what he believes to be the truth: but no addict of a powerful drug like tobacco ever, in my opinion, administers his drug *purely* for enjoyment. He is also motivated by a desire, or rather craving, compulsive in character in the strongly addicted, to keep at bay feelings of deprivation. Dr. Pannet certainly need take no account of the therapeutic effects of tobacco, but he would do well to take thought of its toxic effects. No; smoking is not a vice: it is a drug addiction, a disease. My final exclamation (it was not a statement) referred to published figures giving our purchases of tobacco during the first six months of the American loan, but I did not state (as Dr. Pannet alleges), "One-third of the American loan *is being* spent on tobacco" (italics mine).

General Knowledge and General Practice

Dr. REGINALD LAWRENCE (Wakefield) writes: On page 134 of the *Journal* of July 26 there is a review of a book under the heading "Traumatic Injury." My immediate resort to "Liddell and Scott" for the word "trauma" made me wonder whether this type of injury should be placed in the category of the "gastric stomach" (that unfailing joy of the consulting room) and the "cardiac heart." Will someone tell me when an injury is not traumatic?

Gonococcal Complement Fixation Test in India

Lieut.-Col. S. D. S. GREVAL, I.M.S. (Calcutta), writes: In the last paragraph of his letter (March 8, p. 309) Capt. K. W. G. Heathfield states: "It is one of the many annoying features about medicine in India that many special investigations are not available, including the gonococcal complement fixation test. . . ." Complement fixation test for gonorrhoea has been undertaken in the laboratory of the Imperial Serologist, School of Tropical Medicine, Calcutta, for nearly two years. The details of the technique appeared in the *Indian Medical Gazette*, 1945, **80**, 551.

Two Names Alike

Dr. BRUCE WILLIAMSON (London, W.1) writes: I shall be very glad if you will insert a few lines dissociating myself entirely from the views expressed by my namesake from San Marino, California. I find myself being taxed by colleagues disagreeing with the opinions expressed in the original letter published in the *Journal* of June 28 (p. 950).

Obituary

HUBERT ARMSTRONG, M.D.

Dr. Hubert Armstrong died on June 23 at the age of 75. He was a student in the Liverpool School of Medicine, Victoria University, and obtained the M.D.Vict. in 1900 and the Liverpool M.D. in 1904. He early showed an interest in paediatrics and joined the staff of the Royal Liverpool Children's Hospital, where for many years he was one of the honorary physicians. His sound knowledge, wide experience, and his keenness made him a valuable colleague.

In the first world war he served in the R.A.M.C. with the rank of captain and was on the staff of the 1st Western General, later joining the 57th General Hospital, which was sent to France. In the earlier years of his professional life, in addition to his work at the Children's Hospital, he found time to practise as an anaesthetist. For many years he was medical officer to the Liverpool Orphanage and to the Bluecoat School, where his help was greatly appreciated.

Dr. Armstrong always took a keen interest in the British Medical Association and had been a member since 1896. In 1924–5 he was chairman of the Liverpool Division. Temperamentally he was of a rather shy and retiring disposition. He enjoyed walking, and all his friends will remember his long loping stride with his head well forward. His two main interests outside his profession and his family were photography and philately. He was particularly interested in the stamps of France, of which he had a unique collection. For the last two years of his life he was a sick man and accepted his fate with fortitude. He leaves a widow and three daughters.

Dr. JAMES EDWIN WILSON died suddenly in London on July 9. He was medical officer of health at Mansfield from 1922 to 1943. An Ulsterman, he received his medical education in Ireland, where he qualified in 1904 at the Queen's University, Belfast, subsequently taking his M.D. in 1909. During his early career he held appointments at Birmingham City Infirmary and the Northern Fever Hospital, London. Later he was in private practice in London for three years. In 1911 he entered the public health service as assistant medical officer to Lindsey County Council. After serving in France and Italy with the R.A.M.C. during the first world war, he returned to the Lindsey post for a time, and then became assistant M.O.H. at Grimsby before moving to Mansfield in 1922. He had been a member of the British Medical Association since 1904 and was honorary secretary of the old North Lincoln Division in 1922.

A. H. W. writes: It was with a feeling of great personal loss that I heard of the sudden death of Dr. J. E. Wilson. For over twenty years I was associated with him while he was M.O.H. for Mansfield. His genial bonhomie and cheerfulness made him a well-liked and popular figure in the town, where he was held in high esteem. He retired in 1943 and moved to London, where he carried out part-time duties with the Ministry of Pensions and London County Council, but he never lost touch with Mansfield. "Peter," as he was known to his friends, was a man with a strong personality, frank and outspoken. He was a firm friend, a pleasant companion, and a charming host. As a result of examining many thousands of school-children he came to the conclusion that much ill-health was due to defective breathing, and in 1939 he published an article in the *Medical Officer* on "How to Breathe Correctly," which caused widespread interest. His passing leaves a gap among his friends which will be hard to fill, and our sympathies are extended to his wife, son, and daughter in their bereavement.

Dr. HELEN BAKER died at the Royal Free Hospital on July 8 at the early age of 39. She received her medical education there and qualified in 1932, obtaining the M.R.C.S., L.R.C.P. and the London M.B., B.S. She held several house appointments, including one at the Queen's Hospital for Children and another at Bristol Royal Infirmary, before proceeding to specialize in psychiatry. She took the London M.D. in 1938 and the D.P.M. in 1941. During and after the war years she held a post at Sutton Emergency Hospital, and although the care of her young son and daughter prevented her from doing full-time work she maintained a strong enthusiasm for, and an intense interest in, her medical work. She was hoping to resume a full-time career later. Her untimely death is a great loss to her patients and to her husband, Mr. John Peterson, and family. Dr. Baker had proved herself a natural psychiatrist by not only showing herself to be sympathetic and enthusiastic but also by her balanced view towards this difficult specialty. She was interested not only in child guidance and the problems of psychotherapy but also in social problems generally and nursery schools in particular. She was very popular, was universally liked by her colleagues and patients, and will be sadly missed by all who knew her.

Dr. J. A. P. SHAW died on June 26 at the age of 51. He was educated at Cambridge and St. Thomas's Hospital, and qualified M.R.C.S., L.R.C.P. in 1920. He was junior ophthalmic house-surgeon, and assistant medical officer to the department of Special Diseases at St. Thomas's Hospital; he was also clinical assistant in the Children's and in the Skin Departments. He was later in charge of the Department of Special Diseases at the King Edward VII Hospital at Windsor, where he was in practice. He had been a member of the British Medical Association for 25 years.

Dr. BEAUMONT HARRY COMERFORD, who died in London on July 15, was one of the older practitioners in the West End. The youngest son of Lieut.-Col. Comerford, he was educated at Sherborne School, where he gained distinction as an athlete, winning the mile, half-mile, and steeplechase and being captain both of cricket and football for two consecutive years. He was a student of St. George's Hospital, qualifying M.R.C.S., L.R.C.P. in 1887. He obtained the Durham M.D. and the D.P.H. in 1904. He was successively senior house-surgeon, house-physician, and obstetric assistant at St. George's, and was later resident medical officer at the Chelsea Hospital for Women and for ten years clinical assistant at the Victoria Hospital for Children. Dr. Comerford was also honorary medical officer for the National Children's Adoption Society. He conducted a considerable practice for over twenty-five years in Chester Square and subsequently, until his retirement in 1939, in Ashley Gardens. By his steady common sense, shrewd judgment, and great experience he won the trust, confidence, and affection of his many patients and colleagues. During the 1914–18 war he returned to St. George's as surgeon to the out-patient department and worked there for four years without a break, in recognition of which he was appointed an honorary governor of the hospital. He married in 1905 Elizabeth Frances Shaw Woodgate, elder daughter of the late Rev. R. S. S. Woodgate, of Pembury Hall, Kent, and he leaves a widow and one son.

Mr. ROBERT NOEL MARTIN died after a motor accident on July 25. Mr. Martin, who was only 34, was educated at Campbell College and Queen's University, Belfast. He qualified in 1937 and was appointed house-surgeon to the orthopaedic and fracture department of the Norfolk and Norwich Hospital. He was then on the E.M.S. staff for a while before serving with the Royal Navy. He was demobilized with the rank of surgeon-commander and obtained the F.R.C.S.Ed. in 1945. When the accident occurred Dr. Martin was returning from a holiday in Antrim before leaving for Chatham, where he held an orthopaedic appointment.

The Services

ROYAL NAVAL MEDICAL SERVICE

Applications are invited to fill vacancies for medical officers in the Royal Navy. Candidates below the age of 28 years are preferred. They must be registered under the Medical Acts and be medically fit for service at sea and in any part of the world. No examination in professional subjects will be held, but candidates will be required to attend for interview by a selection board.

Selected candidates will be entered initially for a period of four years' Short Service. Officers who leave the Service at the end of their Short Service will be eligible for a gratuity of £600, tax free. At the end of their Short Service permanent commissions will be given at Admiralty discretion to selected officers who wish to make the Naval Medical Service their permanent career. For officers on the permanent list opportunities are available for postgraduate study to specialize, to take higher examinations, and to obtain further qualifications.

Copies of the regulations for entry and conditions of service, including rates of pay, allowances, and retired pay (also details concerning counting civil hospital time), and forms of application may be obtained from the Medical Director-General of the Navy, Admiralty, London, S.W.1, and from the deans of all medical schools.

The Efficiency Decoration of the Territorial Army has been conferred upon Lieutenant-Colonel (Honorary Colonel) J. P. Raban and Major H. Weir, R.A.M.C.

Medical Notes in Parliament

NATIONAL HEALTH SERVICE SUPERANNUATION REGULATIONS

Mr. JOHN EDWARDS, for the Minister of Health, moved on July 24 that the House approve the Draft National Health Service (Superannuation) Regulations, 1947, proposed to be made by the Minister of Health under subsection (1) of Section 67 of the National Health Service Act, 1946. Mr. Edwards said that these regulations had been fully discussed with all the representative associations concerned and he was not aware of any opposition to them. They provided a superannuation scheme on an insurance basis which would cover all employees of regional boards, executive councils, and other bodies set up under the Act, and also the practitioners providing general medical and dental services. The scheme was a contributory one based on remuneration with payment of 6% for the employee and of 8% for the employer except in the case of manual workers. The employer's contribution would be paid by the Exchequer. The benefits were substantially similar to those of the Civil Service, and provision relating to contributions was similar to that in the local government service. Benefit was based on the final average remuneration except for the practitioner, in whose case the basis was 1½% of remuneration throughout service. The pension provisions took into account the new National Insurance pension. Apart from that, there was a lump sum retiring allowance, a death gratuity for death during service, and the right to a pension for incapacity. There was also provision for an injury allowance and for a widow's pension.

Provision had also been made for interchangeability with other Government services. This would be complete between the Health Service, the Civil Service, local government, and the teaching service. Arrangements were made for transfer into and from the federated superannuation scheme for nurses and the federated superannuation scheme for Universities, as also for other interchanges. The interchange arrangements would help to secure wider experience among the staffs. The new scheme would cover a large number of persons coming from local government service and would take in a considerable number from voluntary hospitals who at the moment were subject to a variety of schemes and arrangements ranging down through moral expectations to nothing at all. Those who were now subject to the federated schemes could continue on the same conditions or could come into the new schemes and do what they liked with their policies. Those subject to other arrangements would be allowed to carry on with these if they could show that otherwise there would be undue hardship. In assessing this hardship the Ministry would have regard to any change of remuneration on the transfer. Cases in dispute would be referred to the tribunals which would be set up to deal with compensation under Section 68 of the Act. Where a voluntary hospital officer with at least ten years' hospital service who in the past had only expectations without any rights came into the new scheme, the value of the expectations in relation to past service would be assessed, and, subject to Treasury approval, a supplementary payment would be made on retirement in addition to what he earned in the new scheme.

In dealing with these provisions the Ministry intended to take a sympathetic and general attitude. It was also provided that all previous hospital service would count for qualifying purposes in the new scheme. Although this service would not count in the calculation of benefit a hospital officer might immediately become eligible for benefits some of which had minimum amounts, as, for example, the death gratuity, which had a minimum of one year's salary. The scheme would be complicated for some years by the transfer problem. It was proposed to set up a new division in the Ministry of Health to deal with this. He believed the scheme would give the staff of the new service a feeling of security.

Some Criticisms

Mr. RICHARD LAW doubted whether he had ever seen a Parliamentary document so complicated and so difficult to read. Some simpler guide to the regulations should be published for the benefit of the members of the new Health Service. The Conservative Opposition did not propose to divide against the regulations but had some criticism to offer and hoped that Ministers would remember so far as the National Health Service was concerned that the Act was not yet in operation and that some elements in the proposed Health Service had not yet decided whether they would come in.

On interchangeability, Mr. Law said his impression was that there was no provision for interchangeability between medical officers of local authorities and the universities. Regulation 38 (m) dealt with the position of a practitioner, whether doctor or dentist, who had a contract with an ordinary life insurance society and was allowed under these regulations to opt out of the superannuation proposals. The health authorities would pay that practitioner, to help him to meet his premiums, the share they would have paid under the proposals. Mr. Law understood that this provision would only apply if the practitioner opted into the service on the appointed day. He said that introduced an element almost of blackmail. A manual worker might enter the service at the age of 18 and was covered from that date, and all his service from the age of 18 counted towards his pension. But the medical practitioner might not qualify until he was 23, 24, or 25. The age of qualification tended to get later. The medical practitioner was at a disadvantage because he lost anything up to five, six, or seven years by being unable to enter the service at an earlier age. Mr. Law asked what was the position of the practitioner who entered the service at, say, the age of 56. The retiring age was 65, and from 56 to 65 there were nine years, but the practitioner did not begin to qualify unless he had ten years' service. This was a real injustice and should be corrected. It might be argued that compensation for the loss of his practice should suffice for a man of 56 who entered the new service. That argument was not sound. The practitioner who was compensated for his practice in terms of money as it was to-day might find when he retired that that money was worth considerably less than it was at present.

Explanation and Interpretation

Dr. HADEN GUEST said the proposal had in fact been explained in the medical and technical Press and he congratulated the Press on a fine job on this very difficult subject. He hoped the Minister could assure him that interchangeability in a case such as the Industrial Health Scheme would be kept open to enable different sectors of medical work to be brought in on an equal footing. He hoped that any necessary changes could be introduced in the future to maintain the principle of interchangeability when the Health Service became a complete medical service in every respect.

Col. STODDART-SCOTT asked in what sort of cases the Minister intended to dispense with the contribution. In Regulation 9 the benefits could be passed from an insured person to his spouse and his dependants, but this regulation referred only to males. Could a female pass on the benefit to her spouse? Regulation 20 said that where someone under the age of 60 years had been ill and received a pension and was then found able to take employment that person could be sent to any part of the country to find employment where the Minister or the employing authority might think fit. That brought in direction of labour. He hoped there was no intention to have direction of male or female officers of the Ministry of Health. Regulation 24 permitted the Minister to pay contributions under any federated superannuation scheme if the policy was taken out before March 18, 1946. What happened to officers appointed after that date? Were they to lose one or two years of superannuation benefit? In Regulation 25 a reference was made to certain classes of voluntary hospital officers who "had reasonable expectations." Would the Minister precisely interpret what was meant by "reasonable expectations"? Regulation 26, if generously applied, could be a great benefit to those who transferred from the voluntary hospitals scheme to the State scheme but might have difficulty in establishing claims for superannuation. He asked whether twenty years' service in the voluntary hospitals before the appointed day would be considered as an "exceptional reason" for the benefits going to these people. On Regulation 38 (m) he pointed out that before the age of 25 a doctor or a dentist might have taken out a life insurance. Why was it necessary for the life insurance policy to be one taken out before the Appointed Day if it was to be assisted from the Ministry? He asked whether the husband of a woman doctor who was in receipt of a pension would receive a pension when she died. Where the husband and wife were both doctors and the husband died did his wife, although probably drawing a retiring pension, get a widow's pension? If both had made contributions to the superannuation scheme he saw no reason why they should not receive two pensions. It was easy for the Minister of Health to coerce voluntary hospitals, but when it came to dealing with the personnel of health services he had to show that he was interested in every aspect of their welfare.

Dr. MORGAN said that under the Asylum Officers Act an officer could retire at the age of 55 with pension. Now the retiring age was to be 65, and Dr. Morgan wanted to make sure that the officer if made to serve up to 65 would receive a pension additional to the one he would have received at 55. He wanted to make sure that if for health reasons a man was

compelled to retire prematurely his superannuation would be given after a proper hearing and a proper trial and exchange of medical evidence and testimony. He wanted to make sure that superannuation on medical grounds was not left as in the Post Office, where a person might be prematurely retired without having his case stated properly.

Sir HUGH LUCAS-TOOTH said quite a substantial proportion of the contributions paid by women would go to men to provide benefit for their wives in due course. If an officer were disabled doing his duty he would be entitled to a pension as of right under Regulation 5 and also eligible to a pension at the discretion of the Minister under Regulation 7. These two provisions could not be reconciled as they stood.

Dr. MORGAN said one regulation dealt with accidents and diseases in industry which came under the Industrial Diseases Act, and the other regulation dealt with a person disabled from any ordinary illness.

Mr. LINSTEAD congratulated the Minister in getting some 60 organizations in the medical profession to agree on this draft. That must be a record. He raised the interpretation of the word "service" for the purpose of Regulation 13. He said that doctors, radiographers, physiotherapists, and speech therapists would want to come into the public service at a late stage in their lives. These persons had little hospital service to count for superannuation. Would it be possible to extend hospital service to cover at least some of these older practitioners?

Concession to B.M.A.

Replying to the debate, Mr. J. EDWARDS said attention had been drawn to a gap in the provisions regarding interchangeability between the staff of local authorities and others. The Government was advised that it should not deal with the subject in these regulations, but it recognized the gap and intended, in agreement with the local authorities, to put the matter right at the first opportunity. With respect to the restriction of claims in regard to insurance policies it would be difficult to allow a different option in this from the options permitted in other cases where the Appointed Day was the operative date. The Government could not prolong indefinitely into the future the right of people to ask for these options. It had not been intended originally to have any option at all. The option was put in because the representatives of the British Medical Association asked for it.

In regard to the proposal that years should be added for the practitioner's training it was impossible for the Government to single out doctors for preferential treatment. The scheme could deal only with actual service. Doctors would enter when they were qualified at the age of 23 or 24 and could complete the full 40 years before they retired at 65, thus earning the full pension. Another point raised concerned the elderly practitioner. At the moment such a practitioner had no pension in prospect but relied on the value of his practice for support when he retired. He would not be worse off under these arrangements and would earn something in the Government's scheme, but the Government could not give special benefits because the practitioner had come in late in life. To discriminate in favour of this group would lead to difficulties in other fields. The argument that compensation based on the money values of to-day might be inadequate when the practitioner retired was common to all pension schemes, and adjustment might be necessary when there was substantial change in the value of money.

He assured Dr. Haden Guest that if at any stage the Government found the scheme was restricted in regard to interchangeability it would not hesitate to alter it. In reply to Col. Stoddart-Scott Mr. Edwards said that the allocation of pension provisions in Regulation 9 applied equally to the woman doctor. In Regulation 20 there was no intention of putting words which would give power of direction later. He agreed that the words used were a little harsh and that it might have been better to say that the Minister would not withhold a pension without offering a man a job. If a man found a job for himself later and there was any difference of opinion between the Minister and the man the Regulations provided for an appeal to a referee appointed by the Minister of Labour. The Minister wished to ensure that he was able to request people who were able to do work to do so and not to permit them to draw a pension when they were fit to work. Regulation 24 referred to March, 1946, because that was the date of the introduction of the Bill and therefore the date on which the Minister's intentions could be assumed to be known. On the other hand the same Regulation later contained a specific provision for those who entered after March, 1946, to be permitted to come in and for the Minister's discretion to be used as though the date were before March, 1946. In all normal cases that discretion would be exercised.

"Reasonable Expectation"

On Regulation 25, entitled "Definition of Reasonable Expectation," he did not think it desirable to define this precisely. The Ministry would go to endless pains to deal fairly with persons. Regulation 26 was not intended to deal with the person who had worked for a period of his service in a hospital. It was solely intended for the super-specialist, a man resembling the person who late in life was taken into the Civil Service at top level. It was not intended to cover people who had hospital service. With the funds at disposal the widows' pensions were the best the Government could do. It had not been able to make special arrangements under which a higher premium could be paid to secure a higher pension for a widow. This was the first time that Parliament had a national scheme with widows' pensions in it. He was sorry to say there was no pension for the widower. The woman doctor did not lose any more than the bachelor. Where a widow's pension was available it was carved out of the retiring allowance, and where there was no such pension the retiring allowance was higher in consequence. Where a man and wife were in the scheme the wife was not eligible for a widow's pension in addition to her own pension rights but got her full sum in pension.

Answering points raised by Dr. Morgan, Mr. Edwards said the Government did not intend to prevent interchangeability in the case of a genuine technical mistake. The mental worker could go at 55 or could stay to 65. He hoped that procedures would be laid down to cover this type of case when the new negotiating machinery was established.

The Government knew that it could not foresee everything, and if experience disclosed a need for modification it would certainly modify. The scheme was not the last word but was easily the most flexible scheme there ever had been in this country and one which was to the advantage of people in the service.

The House then agreed to the Motion to approve the Draft National Health Service (Superannuation) Regulations, 1947, under Subsection (1) of Section 67 of the National Health Service Act, 1946.

Universities and Colleges

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

At a meeting of the Council of the College, held on July 26, Mr. W. Gilliatt was re-elected President of the College. The following officers were also re-elected: *Vice-Presidents*, Sir William Fletcher Shaw and Mr. James M. Wyatt; *Honorary Treasurer*, Mr. Arthur A. Gemmell; *Honorary Librarian*, Mr. F. W. Roques; *Honorary Curator to the Museum*, Mr. Aleck W. Bourne. Mr. H. G. E. Arthure was elected Honorary Secretary.

The following candidates were elected to the Membership of the College: S. J. Aptekar, H. B. Bagshaw, G. H. Bancroft-Livingston, S. Bender, Isabella R. Bishop, J. T. S. Brown, Gwendoline E. Cockrem, J. McD. Corston, G. A. Craig, K. J. R. Cuthbert, R. W. Denziger, B. C. Dastur, Josephine A. Davidson, N. E. C. de la Hunt, W. P. G. Dickson, I. A. Donaldson, Sara M. Field-Richards, T. B. FitzGerald, J. B. Fleming, I. T. Fraser, A. M. Giles, A. McM. Graham, E. F. B. Hamilton, Lois B. Hurter, D. W. James, Eileen I. Jamieson, R. J. McC. Jamieson, D. H. Lees, M. Lipsitz, G. I. Louisson, W. Love, Joan E. W. Mackie, C. J. MacKinlay, J. T. Mair, P. Malkani, W. G. Mills, P. R. Mitchell, Mary L. Neville, E. R. Ormerod, H. G. Page, S. S. Parlee, Nancy Perry, E. E. Philipp, J. G. Pritchard, E. E. Rawlings, Elizabeth M. Rose, Dorothy M. Satur, D. A. Fletcher Shaw, D. J. N. Smith, J. Walker, Ada S. Wong.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At a quarterly meeting of the College, held on July 15, with the President, Dr. D. M. Lyon, in the chair, Drs. Joseph Bryant (Carluke), T. Elliot Elliot (Leicester), J. D. Allan (Bothwell), T. F. Rodger (Glasgow), and R. W. Craig, O.B.E. (Edinburgh), were introduced and took their seats as Fellows of the College. Drs. John Craig (Aberdeen), J. McG. Rogan (Glasgow), J. M. Macfie (Edinburgh), J. C. R. Greig (Kirkcaldy), A. W. Wright (Edinburgh), Neil Macmichael (Edinburgh), Charles Cameron (Edinburgh), and J. A. L. Gilbert (Edinburgh) were elected Fellows of the College.

Prof. R. W. B. Ellis (Edinburgh) and Drs. Simon Btesh (Tel Aviv), J. P. J. Paton (Thornhill), V. H. Wilson (London), A. J. Tinker (Johannesburg), L. F. E. Lewis (Trinidad), P. L. E. Wood (London), J. H. Goonewardene (Colombo), S. J. Fleishman (Johannesburg), A. A. Williams (Middlesbrough), A. W. B. Edmunds (Edinburgh), L. G. Woods (East London), J. C. Williams (Pretoria), A. A. Guild (Airdrie), N. R. Stewart, jun. (British Columbia), D. C. Haig (Edinburgh), R. F. Robertson (Perth), and S. H. B. Blaikie (London) were elected Members of the College.

No. 29

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended July 19.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1947					1946 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	60	1	21	2	—	49	9	19	—	1
Deaths		—	—				1	—		
Diphtheria	202	21	27	16	5	247	23	67	25	20
Deaths	1	—	—	—	—	1	—	1	—	—
Dysentery	56	3	12	—	—	60	4	28	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	3	—	1	—	—	1	—	2	2	—
Deaths		—					—			
Erysipelas			26	5	2			37	8	—
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				32					54	
Deaths	60	5	21	9	3	36	2	13	17	1
Measles*	8,400	455	50	222	8	3,783	492	201	70	1
Deaths	7	—	1	1	—	3	—	—	—	—
Ophthalmia neonatorum	75	6	11	—	—	66	5	29	—	1
Deaths										
Paratyphoid fever	12	2	1 (B)	1 (B)	—	20	—	1 (B)	1 (B)	1 (B)
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	306	19	2	—	3	380	22	2	1	3
Deaths (from influenza)†	3	—	1	—	—	2	—	—	1	—
Pneumonia, primary			102	11				140	19	
Deaths		22		3	5		14		4	6
Polio-encephalitis, acute	16	2				1	—			
Deaths		—					—			
Poliomyelitis, acute	177	19	19	—	3	10	—	2	—	—
Deaths		2					—			
Puerperal fever		5	9		—		3	31		—
Deaths										
Puerperal pyrexia‡	136	6	10	—	—	133	12	21	1	2
Deaths		—					—			
Relapsing fever	1	—			—	—	—			—
Deaths										
Scarlet fever	1,036	73	94	31	29	936	79	104	29	15
Deaths	1	—	—	—	—	—	—	—	—	—
Smallpox	1	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	10	—	—	5	4	6	—	6	4	2
Deaths	—	—	—	—	1	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	1,931	217	40	53	4	2,474	167	25	46	24
Deaths	7	3	1	3	—	4	1	—	1	1
Deaths (0–1 year)	359	42	70	24	8	299	36	64	34	13
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	4,149	681	581	148	111	3,856	571	540	162	136
Annual death rate (per 1,000 persons living)			12·1	9·3				11·9	10·4	
Live births	9,687	1574	1097	396	275	8,921	1356	1158	396	321
Annual rate per 1,000 persons living			22·1	25·0				23·3	25·4	
Stillbirths	216	15	26			241	31	44		
Rate per 1,000 total births (including stillborn)			23					37		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

EPIDEMIOLOGICAL NOTES

Poliomyelitis

The two maps here reproduced give some indication of the geographical distribution of cases in the present epidemic and in the outbreak in 1938. The first map shows the distribution by counties of 423 cases notified during the four weeks ending July 19, 1947. The other map shows the distribution over a period of six weeks at a comparable phase in the outbreak of

FIG. 1.—The distribution by counties of 423 cases of poliomyelitis notified during the **four** weeks ending **July 19, 1947.** The stippled sections of the map show the areas where no cases have been reported over this period.

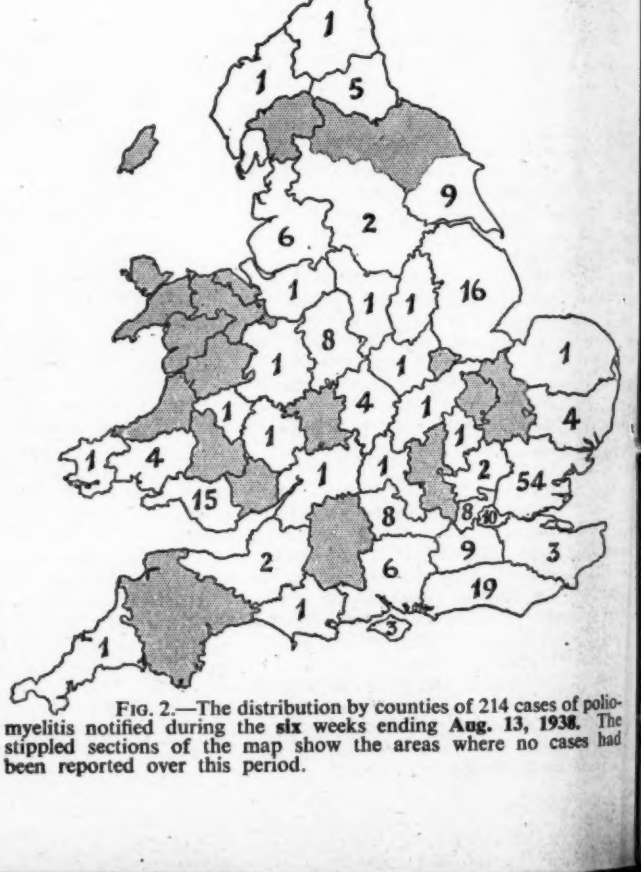

FIG. 2.—The distribution by counties of 214 cases of poliomyelitis notified during the **six** weeks ending **Aug. 13, 1938.** The stippled sections of the map show the areas where no cases had been reported over this period.

1938. It will be recalled that this year there were 31 notifications in the week ending June 14. Prevalence has been unusually low since 1938, and in general notifications have not risen above 30 a week, nor has a significant rise appeared until the end of July. It was therefore thought that it would be useful to compare the distribution for the four weeks ending July 19 this year with the six weeks ending August 13, 1938.

The notifications of poliomyelitis for the week ending July 26 in England and Wales numbered 302, against 177 in the previous week. The gradient in the curve of incidence has become somewhat steeper, and there is nothing to suggest that the peak has been reached. On the contrary, the number of new outbreaks brought to the notice of the Ministry of Health during the past week suggests that a further commensurate rise is to be expected.

Earlier reports had suggested a disproportionate incidence of cases with marked meningeal irritation at onset, but now the more usual and milder clinical types in which paralysis appears without striking prodromal symptoms are being found more frequently, and the steep gradient in the week ending July 26 may be an expression of late diagnosis and delayed notification.

Counties in which notifications reached double figures during that week were: London 51, Durham 20, Essex 13, Lancaster 17, Middlesex 17, Surrey 15, Warwick 20, Yorkshire West Riding 52.

Removals to infectious disease hospitals in the London area have shown a slight fall. The figures for the seven days to July 28 were 70, as against 61 for the seven days to August 4. The incidence in Lewisham, the metropolitan borough so far most affected, appears to be abating.

Although cases are widely scattered over England and Wales, the incidence is by no means evenly spread, and large tracts of the country are not yet involved. The need for prompt diagnosis and notification of first cases in these areas will be apparent. At this stage, when the disease is in the first or second generation in a locality, particular attention must be paid to close contacts, more especially if they develop a minor indisposition insufficient to restrict their movements. At the onset of an outbreak the virus is in all probability confined to the patient and his more intimate companions. Although there is uncertainty concerning the direct mechanism whereby the infection is distributed, it has of recent years become increasingly evident that spread is usually from person to person following fairly close contact with a previous case of abortive or paralytic disease during a relatively short period of infectivity commencing a few days before there is any sign of illness. During the period when infectivity appears to be at its height the virus is present in the oropharyngeal secretions. It may also be present in the bowel at the same time, but the most effective source of infection is probably the mouths of patients during the pre-paralytic phase or of persons with a subclinical attack.

The Belgian Ministry of Health is concerned about the present epidemic in this country, and has therefore cancelled a recent scheme for giving hospitality in Belgium to British children. The Save the Children Fund had made all arrangements to send 500 children for a three-weeks holiday as the guests of the Belgian people. These and similar arrangements made by other bodies have, unfortunately, had to be cancelled.

Polio-encephalitis

Notifications of cases of polio-encephalitis for the week ending July 26 reached 34. The figures for other weeks in July had been 9, 16, and 16, compared with a median value of one or two only during corresponding weeks in 1938–46. When significant changes in polio-encephalitis notifications began to appear it was suggested in some quarters that there might be a prevalence of an infection of the central nervous system other than poliomyelitis, but it is now certain that the bulk of notifications of polio-encephalitis relate to infections with the virus of poliomyelitis. In past years the ratio between cases of poliomyelitis and of polio-encephalitis has not varied considerably but was usually about 6 to 9 : 1. This year's experience is not remarkably different.

Paratyphoid B Outbreak

On July 19 a medical practitioner consulted the St. Albans Health Department about 6 people taken ill in a row of country cottages—Lea Valley Cottages, Wheathampstead. Investigation showed that 4 of the 6 were suffering from paratyphoid B. There had been a vague onset with headache, both frontal and occipital, stiffness of the neck, backache, and continued pyrexia. Gastro-intestinal symptoms were vague or absent. Of the 4 cases, 3 gave histories of onset about July 12, while in the remaining case the onset had been between July 1 and 4.

It was decided to undertake blood and faeces examinations of all persons living in the row of twelve cottages, as there had been a great deal of contact between families. In all, examinations were made of 69 residents and of one girl living at a distance who had been in close contact with the first patient. By July 28 a further 15 people were removed, 13 with a positive diagnosis bacteriologically and 2 with blood titres of a significant level. None of these cases admitted any symptoms before removal to hospital, but by July 30 3 of them had developed frontal headache, pyrexia up to 103° F. (39.4° C.), and mild crops of "rose spots." On July 28 one of the original patients, a woman of 48 who had been apparently making normal progress, had a sudden heart attack and died.

Water supplies (chlorinated main piped water), milk supplies (heat-treated), and foodstuffs including ice-cream have been fully tested and have shown no abnormal features. This, coupled with the grouping of the cases—6 in the first household, and 4, 5, 2, 1, 1—rather suggested that the mode of spread had been by contact with the first household. There is evidence that this family gave milk on many occasions to the two other households most affected. Visits have also been proved to the household with 2 cases, while in the two households with single cases the infection may be explained by contact of a less obvious nature, possibly by flies, which were heavily infesting most of the houses.

Further routine testing of contacts remaining at home continues. In all infected houses this consists of a Widal test and bacteriological examination of faeces and urine; in the non-infected houses the Widal test is omitted. Full co-operation has been given by the Public Health Laboratory at Luton, and the Central Laboratory now reports the organism to be of phage type 1.

Diphtheria Immunization Campaign

The Ministry of Health has recently taken the first steps in organizing a campaign for the late summer and early autumn which is intended to increase the proportion of infants under one year immunized against diphtheria to 75%. Suggestions for posters, leaflets, and other free publicity material are being circulated to all local authorities, together with some information about the progress of the campaign since its inauguration in 1941. In that year there were 50,797 cases recorded, with 2,641 deaths. In 1946 the corresponding figures were 18,284, with 472 deaths. Last year nearly half a million children under five years of age were immunized by local authorities, bringing the total number of children immunized since the campaign began to more than 6,600,000. It is hoped this year to immunize 590,000 babies before their first birthday, and it is suggested that "diphtheria could be eliminated as an epidemic disease if, in each year, three out of every four babies were protected before reaching their first birthday."

Scarlet Fever and Measles in Scotland

In the House of Commons on July 22 Mr. Westwood issued the following vital statistics for Scotland:

Scarlet Fever

Year	Number of Notifications	Number of Deaths
1935	22,670	199
1936	18,320	172
1937	20,493	123
1938	19,605	98
1939	12,023	47
1940	8,353	35
1941	8,760	26
1942	13,792	24
1943	14,722	22
1944	12,057	18
1945	11,654	15
1946	9,774	5

Measles

Year	Number of Notifications	Number of Deaths (All Scotland)
1935	7,891	141
1936	30,981	610
1937	7,543	119
1938	26,383	549
1939	3,516	15
1940	26,125	262
1941	4,467	103
1942	17,888	144
1943	13,601	88
1944	13,900	46
1945	12,714	89
1946	17,503	85

Discussion of Table

In *England and Wales* an increase was recorded in the incidence of scarlet fever 118, acute poliomyelitis 67, and diphtheria 21, while a decrease was reported for measles 733 and acute pneumonia 26.

A small increase in the notifications of scarlet fever was general throughout the country; the largest rise was 29 in Essex. The chief features of the returns for diphtheria were an increase in Lancashire, Liverpool C.B., of 14 and a rise of 13 in Yorkshire West Riding contributed by the county boroughs. The largest variations in the returns of whooping-cough were a decrease of 50 in London and an increase of 42 in Warwickshire. A fall in the incidence of measles was fairly general; the largest declines were Yorkshire West Riding 261 and Gloucestershire 131, while the chief exceptions to the general trend were rises in Warwickshire 106, Lincolnshire 60, and Kent 53. Of the 10 cases of typhoid 4 were notified in Suffolk, Thedwastre R.D., where 9 cases occurred a fortnight earlier.

In *Scotland* decreases were recorded in the notifications of acute primary pneumonia 21, scarlet fever 20, and diphtheria 13, while the only rise of any size was poliomyelitis 12. The largest returns of poliomyelitis were Glasgow 6, Ayr County 4, Aberdeen 3. Diphtheria reached a record low level, and only 27 cases were notified.

In *Eire* the notifications of measles rose by 50 and a decrease of 20 was recorded in cases of diarrhoea and enteritis. The rise in measles was mainly contributed by Dublin C.B., where the number of cases increased from 107 to 152.

In *Northern Ireland* a small decline was recorded in the incidence of most infectious diseases.

Quarterly Returns for England and Wales

The birth rate during the March quarter was 22.8 per 1,000, the largest birth rate for any first quarter since 1920. The infant mortality was 55 per 1,000 live births and was 11 below the average rate for the first quarters of the ten preceding years. The death rate for diarrhoea and enteritis among children under 2 was 6.0 per 1,000 live births, compared with 5.5, 3.9, 3.3, and 4.5 in the four preceding quarters. The general death rate was 17.2 and was 2.5 above the rate for the first quarter of 1946 and 2.4 above the average of the five March quarters of 1941–5.

A new feature of the returns is the inclusion of the sample inquiry into the prevalence of sickness during October, November, and December, 1946. The most important causes of sickness were: ill-defined symptoms; nervous complaints; rheumatism, all forms; colds and influenza. Of the sickness reported 94% did not cause any incapacity. The data are printed in tabular form without discussion. Caution is necessary in attempting to obtain anything more than a general impression from these figures. The sample is too small to be taken confidently as representative of the general population; 2½–3 thousand people were interviewed in different localities each month. The majority of the complaints were self-diagnosed, and the recording of them depends upon the memory of the person interviewed—the information is for the three months preceding the interview. Whether any significance can be attached to the economic grouping is a matter of speculation.

Week Ending July 26

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 987, whooping-cough 1,924, diphtheria 174, measles 7,644, acute pneumonia 311, cerebrospinal fever 31, acute poliomyelitis 302, acute polioencephalitis 34, dysentery 61, paratyphoid 18, typhoid 8.

The Minister of Health announces that the Government will assist financially physiotherapists who wish to take a whole-time course of training as teachers of massage and medical gymnastics and/or electrotherapy. A special training course will be held in London from Dec. 1, 1947, to March 31, 1948, with one week's break at Christmas. Trainees living away from home will be eligible for a maintenance allowance of not more than 50s. a week; those living at home are entitled to not more than 26s. At the end of this 4-months course the trainee will be required to work as a pupil teacher at a school of physiotherapy approved by the Chartered Society of Physiotherapy. The candidate will then prepare for the examination held in May, 1949, and after a further period of 12 months as a pupil teacher may sit for the alternative certificate in May, 1950. Physiotherapists who wish to apply for assistance under this scheme should approach a school of physiotherapy approved by the Chartered Society.

Medical News

Epsom College

In the absence of Lord Leverhulme, who was abroad, Dr. Harold Spitta, the newly elected chairman of the Council, presided at the 94th annual general meeting of the Governors of Epsom College held on July 4. In moving the adoption of the Council's report, Dr. Spitta paid tribute to the merits of his predecessor, the late Mr. D. C. Bartley—member of the Council for 23 years and chairman since 1938—and stated that by his sudden death in May the Council had lost a great chairman and the College a great friend whose charm and dignity were admired by all who knew him. The Governors had also been deprived by death of the valued assistance of Dr. Arnold Lyndon, who had served the College as a member of the Council and of various committees for 20 years, during which time he seldom missed a meeting until his last serious illness in the autumn of 1946. Notwithstanding the many difficulties encountered during the past year the chairman said the progress of the school could be considered as satisfactory, and had warm praise for the head master and the bursar for so successfully overcoming the problems caused by the fuel crisis. Referring to the valuable assistance rendered by many helpers, Dr. Spitta mentioned the Governors' special indebtedness to Dr. Henry Robinson, not only for his personal contributions, but for the great part he played in raising funds, and to the medical journals for their willingness at all times to draw attention to the work of the Royal Medical Foundation.

Excerpta Medica

Of the fifteen new abstracting journals which the Dutch Excerpta Medica, Ltd., propose to issue in English two have now appeared in print, Section XII dealing with ophthalmology and Section XIII with dermatology and venereology. Section XII is planned to have one yearly volume of approximately 600 pages; Section XIII, of approximately 1,000 pages. The Editors, and especially Prof. Woerdeman, are to be congratulated on proceeding with such an ambitious scheme. In the first volume of each section it is intended to include abstracts of papers which appeared as long ago as 1944, 1942, or, in some cases, 1940. This is to bridge in some degree the gap which still exists in many countries where the medical literature of the war years is difficult to obtain. For the general physician *Excerpta Medica* will be found to be somewhat expensive. The smaller volumes of 600 pages a year are to cost £3 15s. *Abstracts of World Medicine* on the other hand, with approximately 1,400 pages a year, costs £3 3s. Other sections of *Excerpta Medica* are to cost £5 5s. or £6 4s. per annum. Section II, Physiology, Biochemistry and Pharmacology, will run to two volumes a year and will cost £11 3s. annually, while Sections V and VI, dealing respectively with pathology and bacteriology, and internal medicine, are to cost £9 6s. for the two annual volumes. The cost of all the fifteen sections will be approximately £85 a year. *Excerpta Medica* should adequately replace the German *Zentralblätter*, which ceased publication during the war, and provide a service for specialists and for large and wealthy medical libraries.

Blood

Two special numbers of the journal entitled *Blood*, edited by Dr. William Dameshek and published by Grune and Stratton, 381, Fourth Avenue, New York 16, N.Y., are being issued. The first, on "Morphologic Haematology," published in July, contains nineteen articles (210 pages). The price is $3.75. The second special number, devoted to "The Rh Factor in the Clinic and the Laboratory," will be published in November at the price of $3.25.

Birmingham Surgical Unit

The Austin Motor Company has presented the Birmingham Accident Hospital with a specially equipped vehicle fitted as an operating theatre to serve as a mobile surgical unit, staffed by a surgeon, anaesthetist, and nurse. The vehicle will be housed and maintained by the Birmingham Hospitals Contributory Association, which will also provide the drivers. The unit comes into operation on Aug. 11 (telephone: MIDland 7041).

Honorary Surgeon Dentist to the King

R. C. S. Dow, L.R.C.P.&S.Ed., H.D.D., has been appointed Honorary Surgeon Dentist to the King in Scotland, in succession to L. C. Broughton-Head, M.B., Ch.B., L.D.S., who has resigned.

Wills

Dr. William Thomson Munro, formerly medical superintendent of Glenlomond Sanatorium, Kinross, who died on March 11, left £21,250. Dr. Eric John Staddon, of Ipswich, Suffolk, who died on Jan. 22, left £33,160. Dr. William Archibald, late medical officer of health for Luton, who died on Feb. 13, left £25,587.

COMING EVENTS

Franco-Anglo-American Medical Society

Lord Horder will open the meeting of the British Section of the Franco-Anglo-American Medical Society, of which he is President in Great Britain, at *3.30 p.m.* on Tuesday, Aug. 12, and not at 2.30 p.m. as announced last week (p. 195).

C.M.F. Surgeons' Dinner

The annual dinner of the C.M.F. Surgeons Club will be held at Claridge's Hotel, London, W.1, on Sept. 11, at 7 p.m. The charge, exclusive of wine, is 25s. Surgeons and anaesthetists who served with the Central Mediterranean Force should apply for tickets through the Secretary of the Club, at 10, Park Square West, London, N.W.1.

Aslib Study Group

The Association of Special Libraries and Information Bureaux has organized a study group on special librarianship, in co-operation with the Library Association, to be held at Chaucer House, Malet Place, London, W.C.1, during the week Aug. 11–16. Fees are £2 2s. for the course, or 10s. per day. Programme and application forms may be obtained from the Aslib office, 52, Bloomsbury Street, London, W.C.1.

U.N.E.S.C.O. Conference

A conference under the auspices of U.N.E.S.C.O. has been planned to take place in October to establish a permanent Bureau of International Medical Congresses. Among the activities considered suitable for the bureau to undertake are the collecting of type cultures, improving the circulation of scientific literature, and the establishing of international stock rooms for pure substances not commercially available—e.g., radioactive isotopes and pure-line strains of laboratory animals.

Narcotic Drugs

The Narcotic Drugs Supervisory Body of U.N. has tentatively fixed Nov. 17 as the day for its next meeting.

APPOINTMENTS

LENNANE, G. A. Q., M.B., B.Ch., Government Medical Officer, Rotorua, New Zealand.

Miss MARJORIE ROUSE is the first nutritionist to be appointed in Tasmania. She is preparing a report for the Commonwealth National Health Scheme.

Miss Rouse, who is a native of New South Wales, graduated from the Science University of Sydney in 1936, and in 1944 came to Britain with a British Council scholarship to work with the Oxford Nutrition Survey. She returned to Australia in 1946.

BLAIR, E. J., M.D., M.R.C.P., Physician, New Cross Hospital, Wolverhampton.

HULL ROYAL INFIRMARY.—*Honorary Physician:* T. Stirling Eddie, M.B., B.S., M.R.C.P. *Honorary Assistant Physician:* T. Morton J. Stewart, M.D., D.C.H.

KENNEDY, D. A. V., M.B., Ch.B., M.R.C.O.G., Honorary Consulting Gynaecologist, Aldershot Hospital.

LONDON COUNTY COUNCIL.—The following appointments have been made in the Council's mental health services for duty at Maudsley Hospital: *Physician,* E. W. Anderson, M.D., F.R.C.P.; *Senior Registrars,* D. L. Davies, B.M., B.Ch., and W. Warren, M.B., B.Chir.

PILKINGTON, FRANCIS, M.B., M.R.C.P., D.P.M., Honorary Physician in Psychological Medicine, Prince of Wales's Hospital, Plymouth.

RUNWELL HOSPITAL, near Wickford, Essex.—*Senior Physician,* P. D. Scott, M.B., B.Chir. *Assistant Physician,* E. H. Cranswick, M.B., B.S.

BIRTHS, MARRIAGES, AND DEATHS

The charge for an insertion under this head is 10s. 6d. *for* 18 *words or less. Extra words* 3s. 6d. *for each six or less. Payment should be forwarded with the notice, authenticated by the name and permanent address of the sender, and should reach the Advertisement Manager not later than first post Monday morning.*

BIRTHS

KERSHAW.—On July 26, 1947, at Liverpool, to Dr. Mary Cowell, wife of Dr. W. E. Kershaw, a second child—a daughter.

LEACH.—On June 1, 1947, at Crediton, to Dr. Irene Bower, wife of Capt. A. B. Leach, a daughter—Gillian Mary. Address: George Hotel, Combe Martin, Devon.

MACRAE.—On July 28, 1947, at St. Brenda's Nursing Home, Bristol, to Phyllis (*née* Mahy), wife of James Macrae, M.D., F.R.F.P.S., a daughter.

WILSON.—On July 26, 1947, at University College Hospital, to Lallie and Maxwell Wilson, a son—Andrew Thomas.

DEATH

COOKE.—On July 29, 1947, at his home, "Whistler's Corner," Shalford, Guildford, after a long illness courageously fought, Cyril John Chesterfield Cooke, M.R.C.S., L.R.C.P., D.M.R.E. Funeral private.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Poliomyelitis and Tonsillectomy

Q.—*There have recently been four cases of anterior poliomyelitis in children in this district. What interval should be allowed to elapse from the onset of the last notified case before tonsillectomy can safely be undertaken on two children (not contacts) living one mile from the outbreak?*

A.—Notifications of poliomyelitis are increasing steadily and it would therefore be unwise to recommend tonsillectomy in any child who is living in an area—urban or rural—where cases are still occurring. The virus may persist in the faeces of convalescent cases for three to four weeks, and be present for the same period in the sewage of the district where cases have occurred. Tonsillectomy should therefore not be carried out for at least four weeks after the last case has been notified.

Period in Bed after Operation

Q.—*After an identical operation with a normal convalescence surgeons may vary by as much as 21 days in the period they keep their patients in bed. Has any really scientific work been done to prove which school of thought is right?*

A.—The question of recumbency in bed after operation is a constantly recurring one, and over the years the pendulum swings freely from one side to another. The necessary economics of war in the United States has restored the popularity of early post-operative activity in that country—with seemingly excellent results. The outlook in this country is distinctly more conservative—probably too much so. To get every case out of bed on the first post-operative day simply shows lack of judgment and experience; to keep every straightforward appendicectomy case (especially when a gridiron type of incision has been used) in bed for a week or more is at least entirely unnecessary. A considerable amount of statistical and clinical research on the subject has been carried out in recent years in the U.S.A., and reference may be made to an article by Blodgett and Beattie (*Surg. Gynec. Obstet.*, 1946, **82**, 485) in which further work is quoted. Summarized, the benefits of early post-operative rising are: maintenance of general physical strength, less painful wounds, shorter stay in hospital and economy of nursing staff owing to patients being able to care for themselves to a large extent, a decrease in wound disruption and infection, a lower incidence of pulmonary complications, and a great increase in morale.

Milk in Schools

Q.—*School-children get 1/3 pint (189 ml.) of milk per day. This entails an enormous amount of labour and a large quantity of milk, although, individually, the amount is insignificant. Is it worth the trouble and expense? Now that children get a balanced midday meal at school, would they not benefit as much from a lump of sugar and a multi-vitamin tablet with the meal? This would free a large quantity of milk and avoid waste, which is bound to occur through absenteeism.*

A.—What is a "balanced" meal? The average school lunch is a good meal, but it supplies only about 25 g. of protein, 250 mg. of calcium, 500 i.u. of vitamin A value (mainly in the form of carotene), and 0.4 mg. of riboflavine; these are not half enough for a day. One-third of a pint of milk supplies a further 6 g. of animal protein, 220 mg. of calcium, about 200 i.u. of vitamin A (mainly preformed), and 0.27 mg. of riboflavine. The value of both school milk and school lunches is well shown in a paper by Chattaway, Happold, and Happold (*Journal*, 1946, **1**, 429). It should be possible to avoid waste by organizing the collection of surplus milk for conveyance to factories. The value of vitamin tablets is doubtful (see Bransby *et al.*, *Journal*, 1946, **1**, 193). School milk accounts for under 5% of the total liquid milk consumed; about 80% of this total is sold through ordinary channels at full price.

Length of Vaccination Scratch

Q.—*What is the Ministry of Health regulation length of scratch for vaccination?*

A.—The Ministry of Health has not yet thought fit to lay down any regulation governing the length of the vaccination scratch. Although no "regulation length" has been prescribed by the Ministry the Vaccination Order, 1930 (S.R. and O., 1930, No. 2), stated in paragraph 7 of the third schedule (Instructions to Vaccinators under Contract) that vaccination should be done by a "linear" incision or scratch "*not more than a quarter of an inch long.*"

Saturated Solutions for Dispensing

Q.—*It is said that in dispensing many doctors use a system of saturated solutions, and that 1 fluid drachm (3.5 ml.) of a saturated solution of the following chemicals contains the indicated quantity of the chemical: potassium bromide 30 gr. (2 g.), sodium salicylate 60 gr. (4 g.), sodium bicarbonate 60 gr., potassium citrate 60 gr., ammonium carbonate 12 gr. (0.8 g.). Are these figures correct, and what is the corresponding figure for sodium chloride? Is it also correct that the potassium citrate solution must have some chloroform in it "to prevent oxidation"? Does the darkening in colour which sometimes appears in the sodium salicylate solution on keeping indicate deterioration?*

A.—The strength of a saturated solution of any pharmacopoeial substance is given in the *British Pharmacopoeia*. The quantities in the question are correct except for sodium bicarbonate, which should be 5.4 gr. (0.35 g.), and for ammonium carbonate, which should be 15 gr. (1 g.). The figure for sodium chloride is 120 gr. (8 g.). The *B.P.* says that potassium citrate should be kept in a well-closed container. There is no authority for adding chloroform to potassium citrate solution; this would not prevent oxidation. The darkening in colour which appears in a sodium salicylate solution does indicate some oxidation but it may not indicate very much.

Thrombosis after Pyelography

Q.—*Following a recent intravenous injection for pyelography of a floating kidney, a middle-aged man of active habits has developed a sclerosis of his right basilic and cephalic veins. (1) To what may the sclerosis be attributed, and may there be other patches of it in the system? (2) Is the condition likely to progress, and is there a possibility of any disablement of the arm or of a clot separating anywhere in the system? (3) What treatment, if any, is indicated?*

A.—It is quite usual for a thrombus to form after pyelography; when, as in this case, it is extensive it shows that the patient is more sensitive to irritating intravenous injection than usual. (1) It is unlikely, without signs or symptoms, that there are more thrombosed veins in this part of the body. (2) There is as a rule no resulting disablement, because there are quite adequate collaterals to prevent oedema and other complications. Separation of the clot does not occur in these cases. (3) There is no treatment indicated except to spare the arm from effort until the condition resolves. Appearance of thromboses elsewhere would be an indication for the administration of dicoumarol.

Pumpkin Seeds as an Anthelmintic

Q.—*One often hears of the alleged efficacy of pumpkin pips in the treatment of taeniasis in South Africa. Recently a patient stated that he had been given, without success, two courses of treatment for tapeworm by the orthodox male fern, and then on the advice of a farmer's wife treated himself by ingesting several handfuls of these pips. What is the therapeutic agent present in pumpkin pips?*

A.—Pumpkin seed or cucurbita *(B.P.C.)*, or pepo *(U.S.P.)*, has for centuries been used as an anthelmintic in the West Indies, Southern Europe, Africa, and the East. It contains about 30% of a fixed oil, an acrid resin, volatile oils, protein substances, and sugar. The resin is probably the active principle. The dose is 1 to 2 oz. (30 to 60 g.) of the dried seed, preceded by a saline purge and followed a few hours later by castor oil. It appears to be safe but unreliable. It is used for roundworm and tapeworm, especially *Taenia saginata*.

NOTES AND COMMENTS

Frustration of Left-handedness and Absent Knee-jerks.—Dr. E. GALLOP (London, S.W.) writes: As always your valuable section headed "Any Questions?" contains much of interest, and this week (July 5, p. 40) there is a reference to the effect of the inhibition of left-handedness in the production of stammering which recalls the case of a young woman I had to examine as to her medical fitness to take up an appointment overseas about a year ago. She appeared to be perfectly healthy, and the only abnormality I could find was that her knee-jerks were absent—really absent. No positioning or reinforcement produced a flicker. She told me that when in the A.T.S. a veritable battery of doctors had been unable to discover why the jerk was missing. I happened to find that she was really a left-handed person and from childhood dexterity had been forced upon her. I could not help feeling that as the result of this most unnatural and gross interference with her inborn characters she had lost her knee-jerk. But it is the only case I have seen and maybe I am barking up the wrong tree.

Bringing Up Baby.—Dr. E. J. DENNISON (East Grinstead, Sussex) writes: The question about "Bringing Up Baby" (June 28, p. 958) did not, I think, receive quite the answer it deserved. Presuming that it was asked in all seriousness, then I suggest that the answer might be as follows: *Instance 1.*—If the baby has been fed and has received attention—i.e., wind up, dry nappy, etc.—then it should be put down comfortably and left. A baby requires peace and quiet in order to digest its food. It does not require "company" at this time, for that could only hinder and delay its digestion. *Instance 2.*—If he is picked up 1½ hours before his next meal, then obviously he will have to be "amused" for 1½ hours. Whoever picks him up cannot reasonably put him down after half an hour and expect him to amuse himself for a further hour. If the parents wish to lavish parental love upon him, as indeed they should do, then I would suggest that, at three months old, half an hour immediately before a feed is the best time to do it, and possibly for a short time after while he is bringing up his wind. Regarding not "thwarting" a baby, surely it is time somebody stamped heavily on this kind of nonsense, which is all too common these days. If life is to be bearable for anybody in the house—and, incidentally, for the neighbours, if any—then the baby must be taught, and taught early, to conform to the rules of the household—i.e., meals at certain times, sleep at certain times, and so on—which everybody else follows as a matter of course; just as, when it grows older, it should be taught the rules of ordinary life in the outside world rather than be left to find them out the hard way for itself. Only by doing these things can the parents hope to retain the respect and friendship of their child as he grows up. An unthwarted baby will grow into an unthwarted child, and thence into an unthwarted adolescent and adult. It would be very easy—and very often, I suspect, not incorrect—to trace a number of our present-day troubles—juvenile crime particularly, but also some adult crimes, divorces, strikes, and so on—to an unthwarted babyhood in the person or persons responsible. Certainly the falling birthrate, which happily at the moment shows a temporary check, is partially due to this mistaken idea that a baby should not be thwarted. How often does one hear, "No more for us. The first one was *quite* enough bother to bring up." To the parents who asked this question I would say: "Assert yourselves now as the child's guide and teacher; show him how to live in modern society, for he obviously cannot know for himself; then you may reasonably expect happiness for him and for yourselves. If you allow him to rule you, as apparently is suggested, then you are not going halfway to meet trouble: you've got it already."

Correction

In the answer to a question about bleached bread (July 26, p. 159) reference was made to "canine distemper." This should have read "canine hysteria."

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